AN HBJ PUBLICATION

May 1983/$2.00

WEEDS TREES & TURF

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School Maintenance: Doing More With Less

Season by Season Pest Control Tips

Spraymen Fight Prenotification Proposal

Insect Control Guide

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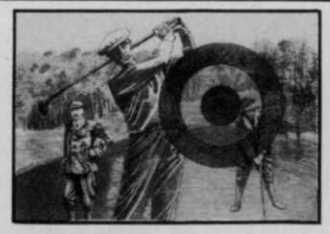
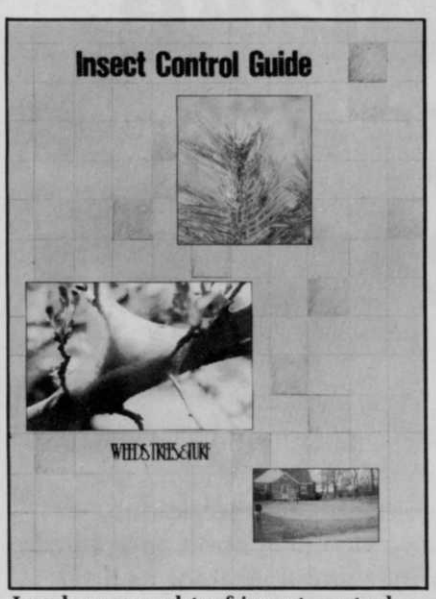


Cover: The idea of target golf is to lower maintenance costs, but some question if less fairway means less golfers. See story on page 20.

MAY 1983/VOL. 22, NO. 5



Landscape and turf insect control, see page 27.

Duke University's landscape program, see page 64.

Detroit area school district controls costs, see page 70.

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Target Golf American Style

Golf course architects see target golf as a partial return to old style standards practiced in the Links Land. Superintendents don't see a big difference in maintenance costs and some owners worry about making their courses too hard.

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Duke's Love Asks Student Support

Duke University Operations Manager David Love takes his case for sharp landscaping to students for support and coordination. A computer helps Love keep track of 900 acres, including the campus, a medical center, and a golf course.

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1983 Insect Control Guide

The first edition of an annual project to prepare landscape managers for insect attack. Emphasis is on control by season of each major insect pest. Quiz yourself on insect recognition. Keep this magazine for reference this season.

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From Buses to Baselines

Detroit area school district places all property management in the hands of a grandmother. Faye Bird uses old school buses to carry landscape equipment.

60
Schools Wrestle Eroding budgets

Falling enrollment and increased demand for recreational fields have school landscape managers searching for ways to stretch their budgets. An equipment solution is hoped for by survey respondents.

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OUTLOOK

By Bruce F. Shank, Executive Editor

Iron country restarts furnaces to capture commercial turf buyers

There is new life in the turf equipment business as I discovered on a recent trip to Iron Country. Distributors are restocking, manufacturers have new models in the testing stage, and turf managers are looking.

What is more, one manufacturer, not currently serving the commercial turf market, is about to announce a complete line of turf equipment this fall. I promised I wouldn't tell you who. And, two more companies would jump in if the distributor network wasn't so complicated.

Don't assume Jacobsen and Toro will get caught by surprise. Their engineers are busy with new models. More importantly, they are going a step beyond to provide new technology for the turf equipment market. Roger Thomas, vice president of Jacobsen, told me, "What we have coming is a unique type of mower technology, one which will be ours, not the same as every other manufacturer." Toro has sold distributors of new entries for this fall.

Ed Devinger, *turf equipment sales manager for Reinders, updates the editor during Reinders Show in Waukesha.*

Ransomes and its Bobcat line are agressively attacking the golf and municipal markets. Sensation has new energy since Gilson took it over recently.

I can't tell you everything now. You'll have to read the whole story in June.

Finally, I'd like to thank Bob Reinders and Ed Devinger of Reinders Turf Equipment of Milwaukee for helping me find my way through part of Iron Country. Their enthusiasm matches that of the manufacturers. Something must be going right for them and as a result, for the turf industry as a whole.

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Hydro-Wet is ideal for greens, fairways, roughs—anywhere you use water. Just mix with water according to label directions, spray turf, then water. As little as a pint of Hydro-Wet will improve water penetration over an area of 1000 sq. ft. Usually, one or two applications a year does the job.

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NEW 1000 SERIES DIESELS

Tough new tractors with a combination of features you can't get anywhere else

Whatever the work you've got to do—around the home, on the farm or at the construction site—one of these new Ford 1000 Series diesels can handle it. Ford offers a wider choice of under-30 horsepower diesel tractors than any other American tractor company.

New 3-cylinder diesels power five of the six new models. Your choice of 11.5, 13.5, 16.5, 19.5, 23.5 and 28.5 PTO horsepower.* You get excellent fuel economy, and all the power you need, without paying for power you'll never use.

Exclusive Synchronized Manual Shuttle Transmission speeds work on many types of jobs. Available on 16.5 horsepower and larger models, this slick-shifting optional transmission lets you synchro-shift from forward to reverse with a simple straight-throw movement of the steering column-mounted range lever.

Hydrostatic drive. Here is the ideal transmission for compact mowing jobs. This optional drive for the 11.5 and 13.5 horsepower models lets you control speed and direction with simple foot pedal action. No need to clutch or shift gears.

FORDS!

Full-time live hydraulics. The new 1000 Series tractors give you easy fingertip control of mounted farming or grounds maintenance implements... and big flow capacity for loaders and other hydraulic equipment.

Four-wheel traction. Every 1000 Series tractor is available with an optional front-wheel drive system that cuts wheel slip, increases drawbar horsepower and reduces fuel consumption in tough working conditions.

Implements to match. There's a full complement of more than 50 attachments, implements and equipment to handle all kinds of jobs–anywhere there's work to be done.

Ford parts and service backup. Your local Ford Tractor dealer is a full-time tractor dealer. He maintains a large parts inventory and his mechanics have the experience, special tools, and training to service tractors quickly and correctly.

If you're looking for a tractor that's compact in size and big on work... check out the new 1000 Series tractors, at your Ford Tractor dealer.

**Manufacturer's estimate.*

Model 1910, 28.5 hp, not available until Fall, 1983.

FORD TRACTORS

Circle No. 120 on Reader Inquiry Card

STATE LAW

Washington fights sprayer discrimination

Two democratic state representatives from Seattle are causing Washington state certified public applicators to band together to fight against legislative discrimination.

John Beheyt, president of Eastside Spray Service in Seattle told *Weeds Trees & Turf*, a change in the pesticide license law being considered by the state Committee on Environmental Affairs could require certified public applicators to notify residents of property adjacent to or within 100 feet of spraying in advance. "More than 25,000 applications per year would be effected by such a change in the law," Beheyt said. The change would exempt farmers, pest control operators, and government applicators, thus selecting out certified public applicators for restrictions. Private gardeners who spray less than 12 feet high and do not spend a major part of their time making pesticide applications are also exempt.

"We use proportion injectors for our lawn care trucks and may put down four chemicals at the same time," said Beheyt. "According to the law, we have to notify each adjacent property owner of the characteristics of all four pesticides since our applicators make the determination of what is needed during the call."

Beheyt is also 2nd vice president of the Washington chapter of the International Pesticide Applicators Association (IPAA). IPAA and applicators from across the state travelled to Seattle for the hearings. "We had 125 people at the first hearing wearing badges, but only two got to speak. The second hearing we had more and were allowed to speak for nearly two hours. The second hearing was a success. If we get it moved to the Agriculture Committee where it belongs we will have won. The Ag department feels the present law is sufficient and funding is the real problem since the state can only afford four enforcement officers currently."

The problem started when a yard next to a school was sprayed and children attracted to the area ran through the treated grass. Two representatives heard from concerned parents and the whole affair started to blow up. "By banding together, we have nearly put the issue back into perspective," says Beheyt. "It's a totally new experience for us and everyone should be prepared for such an uprising."

Beheyt says they will take the issue to court if it is passed by both houses. "It's unconstitutional to legislate just certified public applicators."

Update—The controversial prenotification bill in the Washington state Environmental Affairs Committee was killed after a massive effort by pesticide applicators and various other groups. It never got out of committee according to Bill Harland, president of IPAA.

A worldwide seed production and marketing agreement was recently signed by the Jacklin family of Jacklin Seed Co. and representatives of Japan's Snow Brand Seed Co.

MEETINGS

Sod goes international at ASPA summer show

Sod producers from Australia, Israel, the UK and other countries are expected to attend the First International Meeting, the day before the American Sod Producers Association meeting in Atlantic City in July.

A panel of sod growers outside North America will speak, as well as A.J. Turgeon from Texas A&M, Richard Hurley from Lofts Seed Company, and Henry Indyk from Cook College. Gerry Brouwer, president of Brouwer Turf Equipment Ltd., Keswick, Ontario, Canada, is chairman of the international committee.

"We are testing the waters," says Bob Garey, executive director of ASPA. "In previous years, foreign sod growers have attended our field days and returned to start up associations in their countries. Since they are not competitors, U.S. growers talk openly with the visitors. We may have an international meeting every other year or so."

SEED

Manhattan II ryegrass is now on the market

The concerted efforts of turf seed breeders and Turf Seed Inc. and Whitney Dickinson Seed Co. have resulted in the release of a new generation Manhattan perennial ryegrass called Manhattan II. Bill Rose of Turf Seed and Drew Kinder of Whitney Dickinson made the announcement at the International Turfgrass Conference in Atlanta in February.

The improvement of Manhattan to increase disease resistance was carried out jointly by Bill Meyer of Pure Seed Testing in Hubbard, OR, and Dr. Reed Funk of Rutgers University in New Jersey.

Limited supplies of Manhattan II are now available from seed distributors and full availability will begin this fall.

Manhattan was not protected by the Plant Variety Protection Act since it was released prior to the act. Manhattan II is patented under this law assuring buyers of pure Manhattan II in their bag. Manhattan was found in Central Park in New York City. Manhattan II was selected from thousands of crosses from Manhattan and other select perennial ryegrasses in testing.

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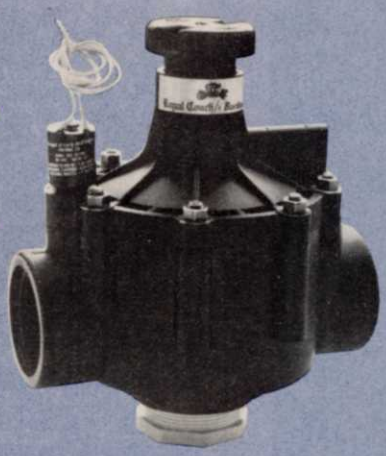

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GOLF UPDATE

Golf, maintenance continue to grow

Golf is alive, thriving and growing, according to Sandy Eriksson, director of research for the National Golf Foundation, North Palm Beach, FL. At the recent International Turfgrass Conference and Show in Atlanta, Eriksson said there has been a 26.1 percent increase in golf activity over the past five years. New courses opened for play numbered 688 which included 582 regulation, 75 executive and 31 par-3 courses. The short course trend is toward the executive course. The steadily decreasing percentage of private golf facilities will hopefully reverse itself as the post World War II baby boom babies attain more discretionary income and see the private course as an avenue for business and social contacts, according to Erikkson.

The leading states in golf course openings were Florida (127), California (46), Michigan (44), Texas (42), Arizona (32), South Carolina (32), Ohio (18) and Minnesota (15). In the Sunbelt States, especially South Florida, golf courses attached to real estate ventures are still the best drawing card with retirees swelling the golf ranks.

What all these golf courses translate to in maintenance costs, according to a National Golf Foundation estimate, is $778 million in 1978 as opposed to $1.2 billion in 1982; that's roughly $92,000 per course per year average. Those costs can be affected in the future by dropping petroleum prices, better players, better designed courses and superintendents becoming better educated in maintenance procedures, according to Eriksson.

According to the NGF fourth quarter survey, golf activity in 1982 shows that play increased 7.6 percent during 1982 to an estimated 425 million rounds. That figure represents a gain of 30 million rounds over 1981. The U.S. golfing population in 1982 was comprised of 54 percent males, 17 percent females, 7 percent junior (18 and under) and 22 percent seniors (55 and older).

E-Z-Go's Patterson appointed director

Ronald V. Patterson, president of E-Z Go Golf Car Division of Textron Inc., has been named to the National Golf Foundation's Board of Directors. The announcement was made by NGF Board Chairman Jerry D. Martin.

An Ohio native, Patterson has been in the golf car business for the past 15 years, first as an independent distributor of E-Z-Go golf cars in Ohio and later joining the E-Z-Go sales force as regional manager in February 1972.

NEWS *from page 10*

GOLF

IAGA elects slate of officers

The International Association of Golf Administrators has elected Dennis Davenport, Chicago District Golf Association Executive Director, its 1983 president. Davenport succeeds James Sykes, executive director of the Golf Association of Philadelphia.

The IAGA was founded in 1963 and has an international membership of 53. Its membership is golf administrators, primarily executive directors of golf associations around the world. The Association provides a forum for exchanging ideas and methods of operation, according to Brian Fitzgerald of the Western Golf Association.

At its annual meeting, the IAGA also elected the following officers: Eugene Haas, Wisconsin State Golf Association, vice president; Jan Taylor, Toledo District Golf Association, secretary; and Hal Van Hoy, Carolinas Golf Association, treasurer. Each will serve for a year.

CHEMICALS

Stauffer makes executive changes

Stauffer Chemical Company has announced several executive changes in its Agricultural Chemicals Division, including the appointment of two assistant general managers.

John J. Burke and Donald J. Martin have been named assistant general managers. Joseph S. Chirtel has been named director of manufacturing and David F. Martin is director of marketing. Rodger M. Hankins becomes manager of manufacturing plants and M. Dirck Reichard has been named director of industry relations for the Division.

GOLF

Radko honored with ASGCA Ross Award

Alexander M. Radko, former National Director of the Green Section, United States Golf Association, has been named the 1983 recipient of the Donald Ross Award presented annually by the American Society of Golf Course Architects to a person who has made significant contributions to golf course architecture.

continued on page 16

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IT CAN'T BE DRIVEN INTO THE GROUND.

Put a Kubota diesel tractor to work and watch it go. Watch it load, mow, rotary till and dig. There's just one thing that you'll rarely see a Kubota do. Quit.

That's because it's powered by a strong diesel engine. It operates with less noise. Less vibration. And with no carburetor, spark plugs or distributor to wear out, there's less maintenance.

There's still another reason Kubota tractors keep running on and on and on. These small and mid-sized models all come with features usually only found on larger tractors.

The L355SS model digging in here is a good example. A 4-cylinder 29 PTO diesel workhorse, it does all kinds of commercial landscaping, industrial and loader tractor jobs.

And the L355SS is the only tractor of its size with hydraulic shuttle-shift. It goes from forward to reverse without using the clutch or gearshift. Thanks to power steering and our unique 4-wheel-drive system with bevel gears, this tractor is also remarkably maneuverable in a tight spot.

The L355SS and all Kubota B- or L-Series models are guaranteed to be dependable for a long time. Our two-year limited warranty is unmatched by other manufacturers. Your dealer has complete details.

So stop by your Kubota dealer soon. While you can't drive our tractors into the ground, you can take 'em for a test drive.

KUBOTA
Nothing like it on earth.

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LANDSCAPE UPDATE

Co-winner announced in Irrigation award

The Irrigation Association awarded the National Water and Energy Conservation Award to the Denver, Colorado Water Department and the Associated Landscape Contractors of Colorado. The award, presented annually, recognizes the two groups' efforts to promote water conservation through creative landscaping in an urban environment through their "Xeriscape" program. Sheldon G. Pooley, president of the Irrometer Company, Inc. of Riverside, CA was the recipient of an Honorable Mention.

ASLA test booklet available

An updated, comprehensive manual on how to prepare for, how to take and how to do well on the Uniform National Exam (UNE) for Landscape Architects has been published by the American Society of Landscape Architects (ASLA). In order to be licensed to practice in many states, landscape architects must successfully complete the UNE. The examination is prepared annually by the Council of Landscape Architectural Registration Boards (CLARB) in Syracuse, NY.

The Uniform National Exam Study Guide for Landscape Architects is aimed at maximizing a candidate's study time and performance on the exam. The guide provides a methodology which allows the candidate to understand what he or she needs to know in order to be adequately prepared for the exam. The guide was written by professors of Landscape Architecture at the University of Florida and Ohio State University.

The study guide is available to ASLA members for $12 per copy and to non-ASLA members for $17 per copy (plus $2 per copy UPS postage and handling). The ASLA is located at 1733 Connecticut Ave. NW, Washington, D.C. 20009.

NLA honors landscape designs

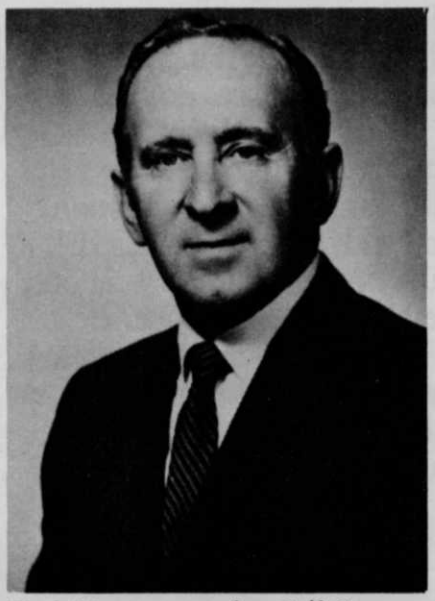
Thirteen Superior Design Awards, including a special Judges Award and seven Certificates of Merit were presented to landscape firms during the National Landscape Association Awards Luncheon recently. Eight projects were selected in the Single Family Residence category: Ireland's Landscaping, Inc., New York; Theodore Brickman Co., Illinois; and Soter Companies, Inc., Oregon. Fininvest Landscape Inc. won the Judges Award. Six entries received superior ratings in the Active Use category: Schlick Landscaping Inc., New York; Landscape Innovations Inc., New York; Steven Dubner Landscaping, Inc., New York; Goldberg & Rodler, New York; and Contemporary Landscapes Inc., New Jersery. Three won in the Passive Use category: Synnestvedt Landscape Co., Illinois; and Ireland's Landscaping, Inc. Kale's Nursery & Landscape Service, New Jersey, was awarded a Certificate of Merit.

NEWS *from page 12*

called the father of American golf course architecture.

"Al Radko has long worked with golf course architects to provide American golf courses with the best turfgrass in the entire world," said ASGCA President Jack Snyder. "He is an industry leader of national prominence, a dedicated educator and a professional with great personal character."

Snyder said Radko's work as primary editor for the new USGA book,



Turf Management for Golf Courses, helped provide information and guidelines that will prove useful to all those interested in good golf courses for many years.

Previous recipients of the Donald Ross Award include Robert Trent Jones, Herbert Warren Wind, Herb and Joe Graffis, Joe Dey, Gerald Micklem, Gov. James A. Rhodes of Ohio and Geoffrey Cornish.

HERBICIDES

Label additions expand Princep versatility

Princep herbicide from Ciba-Geigy, long used for broadleaf control in corn, citrus, deciduous fruits, nuts, turfgrass, tree plantings and alfalfa, will offer growers more versatility in 1983 with label additions and new tank mixes accepted by the EPA.

Princep herbicide now may be used alone to control winter annual weeds in fairways and lawns of bermudagrass, centipedegrass, St. Augustinegrass and Zoysia grass. Weeds controlled include annual bluegrass, burclover, carpet burweed, chickweed, corn, speedwell, henbit, hop

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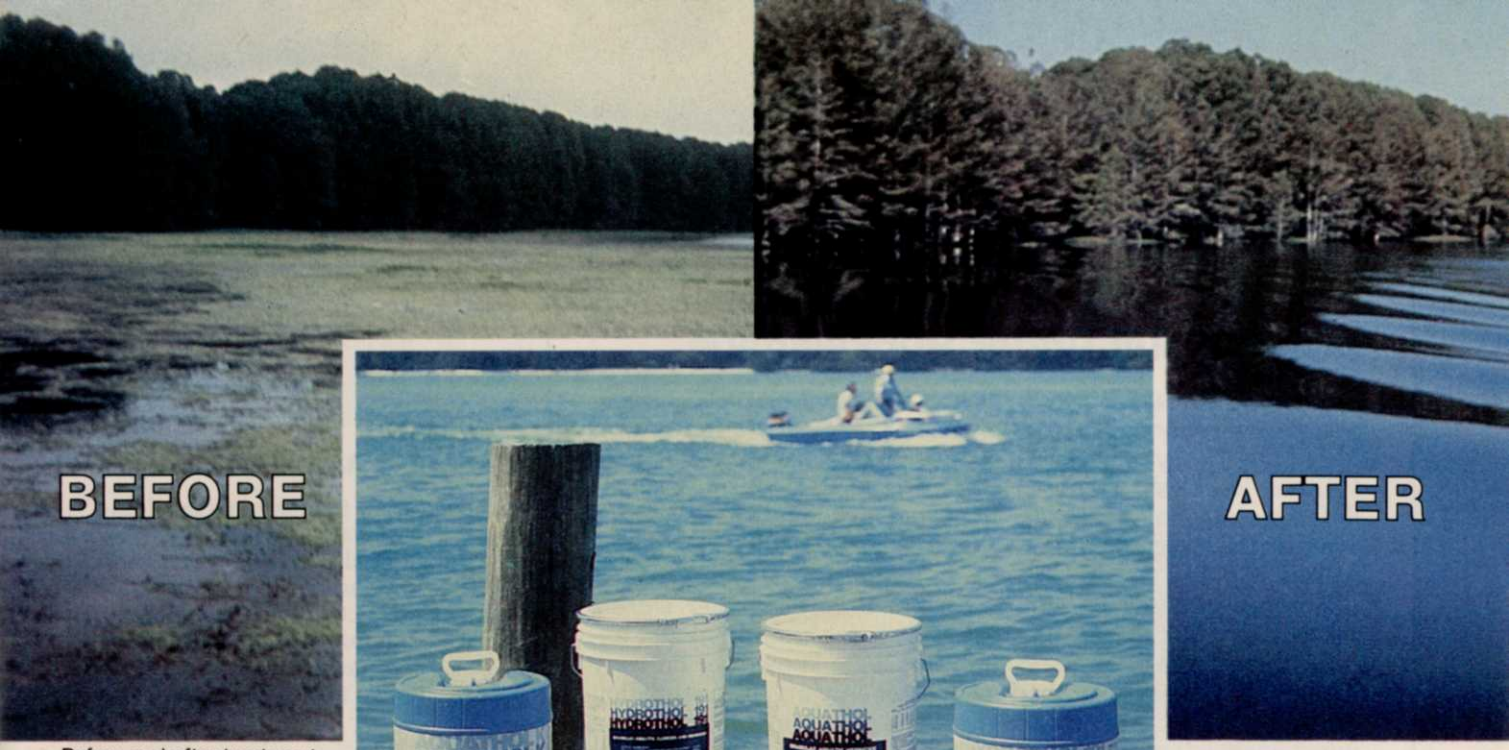

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Pennwalt products control many troublesome weeds and algae, including hydrilla, coontail, milfoil and pondweeds.

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All Pennwalt aquatic herbicides are based on endothall. Endothall salts disappear rapidly from the water and soil through microbial degradation and do not accumulate in the food web. Properly applied, Pennwalt aquatic herbicides provide a satisfactory margin of safety to birds, mammals, and aquatic fauna. And Aquathol formulations have a wide margin of safety to fish.

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GOVERNMENT UPDATE

Tougher, more reliable EPA could result under Ruckelshaus

The Anne Gorsuch Burford reign at the Environmental Protection Agency may have been the most pro-industry in the 12-year life of the agency, but it was also the most attacked. The return of William Ruckelshaus, the original administrator of the agency, will hopefully lend assurance to the chemical industry. Their investments in research data and product development will not be wasted.

The agency has waivered from one extreme to another. During the Carter years the agency was known for environmental extremists as much as the Gorsuch years were known for industry extremists. Posters in the halls of EPA openly urged cancellation of many major chemicals during the Carter years. With such a mood inside the agency, manufacturers had reason to worry about the fate of their products, since each carries millions of dollars of development costs.

During the Burford years, progress was made by chemicals tied up for years in previous administrations. But, costly data was carelessly provided to competitors by EPA staff in a few cases. Progress also came from State Local Needs labels, where manufacturers could direct certain product registrations at key states rather than wait for a Federal label.

But these advances were in jeopardy since the Burford administration was drawing so much fire from environmental groups and the media. Reliability in Burford policies was failing.

Ruckelshaus has the support of both environmental and industry groups. He is knowledgeable about herbicides from his years as vice president of Weyerhaeuser, a major forestry company. He was the first implementer of the laws which created EPA. And, he doesn't play political games, evidenced by his refusal to carry out Nixon's orders during Watergate as assistant attorney general.

Clearly most of his attention will be drawn to the implementation of the Toxic Substances Act, not pesticide programs. The one chemical in jeopardy in this industry is 2,4-D. Ruckelshaus is very familiar with 2,4-D's benefits as well as its risks. Any chance for major changes in pesticide policy is therefore reduced and the ability of chemical companies to plan is increased.

Chemical company plans also depend heavily upon their liability in pesticide disposal. The sooner these policies are clarified, the better chemical companies can plan and function with confidence. **Bruce Shank**

Former EPA head joins watch group

Douglas Costle, administrator of EPA during the Carter presidency, is part of a group of former Carterites who organized recently to oversee activities of the Reagan administration. Citing a lack of conscience, the group plans to develop studies, testify before Congressional committees, provide daily comment, and serve "as a harbor for whistleblowers." Members of the group served Carter in the Department of Agriculture, OSHA, National Highway Safety Commission, Consumer Products Safety Commission, and the Federal Trade Commission.

NEWS *from page 16*

clover and spurweed. The herbicide should be applied after October 1 but before winter annual weeds emerge, or in late winter for control of annual summer weeds. Two applications of Princep are permitted a year.

CHEMICALS

Diclobenil 4G changes name

Diclobenil 4G, formerly marketed under the trade name Casoron, will now be sold as Dyclomec and Norosac by pbi/Gordon Corp. under the Acme label. The product has not been changed and remains an effective pre-emergence herbicide against a wide spectrum of annual and perennial weeds.

HERBICIDE

Banvel-720 labeling is revised

Several tank mixes recently approved by the EPA and a more flexible water dilution range are among revisions in the labeling of Banvel-720 herbicide, a water soluble herbicide used for brush and broadleaf weed control in industrial vegetation management programs.

For control of annual and deep-rooted perennial broadleaf weeds, Banvel-720 may now be mixed at a rate of one gallon in 14 to 400 gallons of water. Previous labeling specified use of one-half to one gallon of Banvel-720 in 100 gallons of spray mixture only.

According to Dr. Hugh Crowley, product development representative from Velsicol Chemical Corporation, the change in the dilution range of Banvel-720 offers user advantages through improved convenience, more favorable economics and in equipment flexibility.

"This change gives applicators much more flexibility according to the job that's being done," Crowley says. "Where you can get good weed control with lower volumes of water, it's more convenient to use less.

"Also, where water availability becomes a critical factor in the cost of performing a job, it's more economical to be able to use lower volumes of water. Where high water volumes are necessary, such as in a handgun application on thick vegetation, the ability to use up to 400 gallons of water is beneficial.

Banvel-720 may now be mixed with Hyvar, Karmex, Krenite, Pramitol, Spike, Velpar, Msma, 2,4-D or paraquat.

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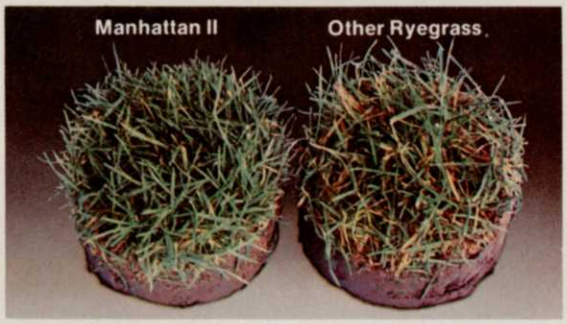

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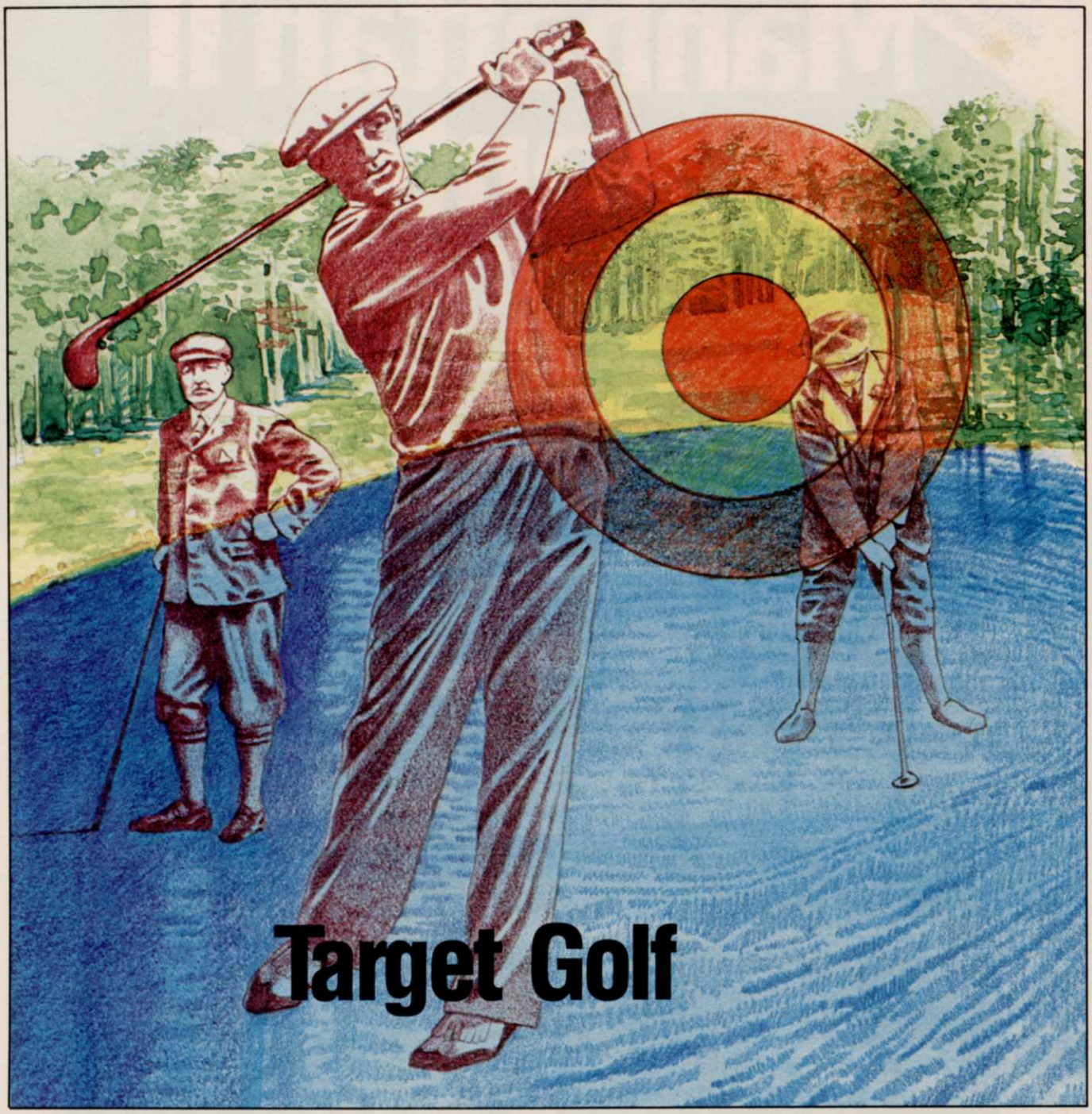

Target Golf

Superintendents and architects work out details to make American golf go forward into the past

By Michelle Palmer

The idea could be a blessing in disguise, a cost-cutting measure that consequently adds an important dimension to the game of golf. Or it could be an unnecessary move that opposes what most Americans value in the game. It depends on who you ask.

The idea is target golf. It involves reducing the fairway area on the course and increasing rough areas, which could include taller grass, sand traps and natural brush. The golfer is provided with a specific target at which to aim and the course is given a more natural look, such as those in Scotland. The American trend tends to be an extremely toned-down variation of the target courses found abroad.

Prompted by increasing maintenance costs and restrictions on water, the move involves, according to some architects, adding some integrity to the game that is present in courses in Scotland and England but absent from most American versions.

Jack Snyder, president of the American Society of Golf Course Architects, points out that while it is a recent movement in American course architecture, it is not a new idea.

"The trend, as far as I'm concerned, is going forward to the past," Snyder said, "It's really the way golf was played in Scotland and England. With the cost of maintenance going up, we have to find ways to reduce."

"For a variety of reasons, including maintenance costs, the integrity of the game and pure aesthetics, I think target golf will become a very important theme in golf course architecture," said Brian Silva of Cornish & Silva, Inc., Golf Course Architects, formerly an agronomist with the Northeast Green Section, USGA.

"We're still talking about beautifully maintained fairways, but just not as wide as in the past," he explained.

Just as the name implies, target golf makes the golfer concentrate on accuracy over power. As Silva sees it, the surface of the tees will be maintained with just as much intensity as they presently are, but the banks around them will be rougher. At least 100 yards or more from the tee will be a fairway maintained just as nicely as possible, but not as wide as usual. About 30 to 40 feet from the greens will also be taller grass.

Much of the fairway restructuring will be accomplished through contour mowing. This step alone will not create the type of target courses Scotland is known for, but a more limited, Americanized version of the Scottish principle.

Architect Geoffrey Cornish believes this concept plays an important part in creating American target golf courses.

"We're doing it largely through contour mowing," Cornish said. "We're bringing the roughs into the fairways. I'm a great advocate of letting the grass grow taller, sometimes overseeding it," he says.

A common concern of opponents to the move is that, along with the change in course structure, the game will become more difficult. However, proponents contend that protection of the average golfer is considered.

According to Cornish, the concept behind contour mowing is to reduce the area of fairway turf to save maintenance money, and at the same time keep in mind the different ability levels of players.

The fairway is kept wide near the tee, where most high handicappers' balls land, and narrow where the long distance hitters and low handicappers place.

"We don't want to hurt the high handicappers," Cornish explained. "The longer one hits the ball, the more accurate he must be. That's our principle."

Ted Horton, superintendent at Westchester Country Club, said, "It puts a premium on accuracy rather than distance." Harder hitters may be discriminated against.

Silva points out, however, that with a 100 yard, wall-to-wall fairway, the golfer has nothing to aim at, no point on which to concentrate hitting or avoiding.

"I believe it helps the golfer when he stands on the tee to see where the ball should go," he said.

"It definitely makes the golf course more interesting," Cornish added.

Continued on page 22

Jack Snyder

Geoffrey Cornish

Harry Eckhuff

Ted Horton

Jack Snyder believes this is a cost-cutting measure that is not only helpful but often necessary. "With the cost of maintenance going up, we have to find ways to reduce," he maintains.

According to Snyder, rough areas require less attention. Sprinkler systems, for example, can be modified to provide fairway areas with their usual amounts of water, but to reduce the water used on intermediate areas and roughs. Although the computerization of systems to perform in this modified way is itself an added expense, Snyder points out it may soon be necessary anyway due to frequent water shortages and restrictions on water consumption.

The target golf concept holds possibilities on some courses, but will it become a widespread trend to sweep American golf? Probably not. Snyder points out not every course will be interested, and that it will gain more acceptance in private courses catering to better golfers.

"It certainly is happening on country club courses," Cornish agreed. But even an advocate of the idea, he explained that some public courses have shown a 10 to 20 percent drop after narrowing their fairway areas.

For Bill Lyons Jr. of family-operated Lyon's Den Golf Club, the results of such a transformation would hardly be advantageous.

"I like to see a course where most of the hazards are visible so the golfer knows what he is up against." Cadanelli.

"We are strictly a public course. I have no members to pick up the tab. I depend on daily golf fees," he explained.

Most players of his course are amateurs or beginners. He feels that making the game more difficult for them would slow them up on the course, create lines waiting at the tees, make people dissatisfied and business would drop.

Bruce Cadanelli, superintendent at the Hollywood Golf Club, maintains similar apprehensions.

"You want the golf course to be enjoyable and to be played in a moderate amount of time," he said. A course requiring six hours to complete is not going to encourage new golfers to play or return to a course.

He contends that most American golfers play for social reasons, for enjoyment of being outdoors and the chance to occasionally play an exceptional round. "I don't know if they want a constant challenge" Cadanelli said.

Lyons gives his patrons what he feels they want.

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Continued on page 24

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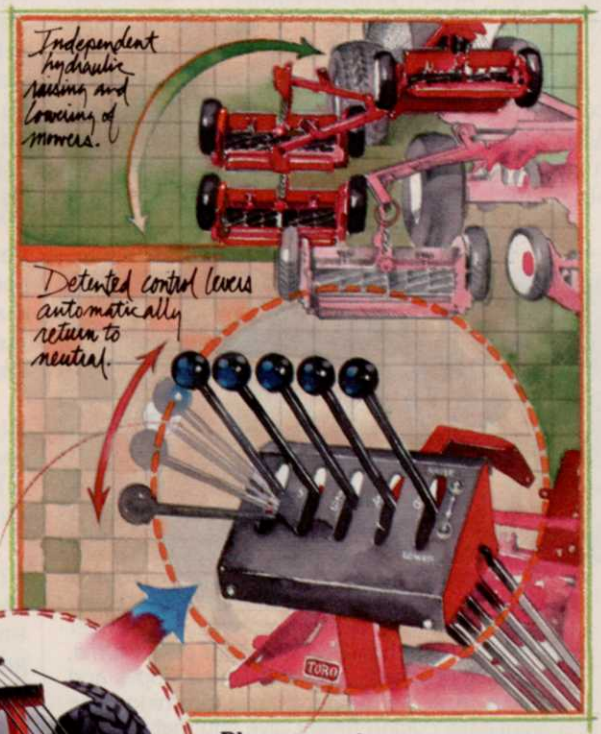

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enough to get a change of color," Lyons said.

Public golfers aren't complaining. Lyons said that every year his business increases, not only from greens fees but from increased volume.

For golf professional Arnold Palmer, the idea of reduced fairway area is no problem. Although he foresees it happening on a number of courses, he also feels it can discourage many golfers.

"I don't really mind. Target or restrictive golf is fine, but you have to consider all the people who aren't professionals," Palmer said.

As far as reduced maintenance costs, Lyons sees none. "I have to drag my mowers around anyway. There's no way I could justify decreased costs," he declared.

What Bruce Cadanelli sees in terms of maintenance is not so much a cost reduction, but a change in quality. Having eliminated ⅓ of his fairway turf, dropping from 30 to 21 acres, he hasn't noticed any savings. What he believes may be happening, though, is that the money not spent on fairway turf may be spent elsewhere on the course in terms of better quality or improvements.

He maintains that strategy can be built into a course by design.

"I don't really favor target golf, per se, where a person has to hit a specific target and by missing it by a small amount is severely penalized. I don't think that person is likely to come back to that course.

"What I like to see in a course is a situation where most of the hazards are visible so the golfer knows what he's up against," Cadanelli explained.

He does advocate the type of strategic courses created by some degree of contour mowing. He also encourages multiple tees, so the golfer can choose how difficult a game he wished to play on a daily basis.

Brian Silva would like to see the attitudes toward tee positions changed. He finds it would be beneficial if older players or beginners would use the closer tees, discarding the stigma of women's and children's tees. Three or four separate tees would almost be necessary to the idea of contour mowing, so different types of players are not discriminated against.

> "A course requiring six hours to play is not going to encourage new golfers." Cadanelli.

As far as this direction changing the way golf is viewed by American golfer, Ted Horton believes that pros and amateurs are playing better golf; so there should be little difference in attitude between private and public clubs.

Bill Lyons maintains that his public golfers want the ball to sit on fairway turf like it was on a tee. They tend to scoop the ball.

Continued on page 26

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TARGET *from page 24*

"You've got to appeal to the people you serve," he contends.

Most agree, however, that the spread of the target trend will rely largely on superintendents.

"A large part of it is the initiative of the superintendent. They want to get down to 20 acres of fairway instead of 50. Everyone is after them to reduce," Cornish said.

Silva adds, "As an agronomist, if I suggest to a superintendent he only mow in front of the tee twice a week, he's the one who must listen to the complaints of the golfers who are used to having it another way."

"I don't think superintendents are afraid of strategic golf," Cadanelli offered. "I don't know if the American golfer wants a challenge on a day to day basis."

He sums it up as a matter of degrees. "Scotland is one end of the spectrum. They may be undermaintained and are operating on lower budgets. We are probably overmaintained."

He would like to see some sort of middle ground established, which would reduce some maintenance and still appeal to the average golfer, which would make private courses more accessible to everyone. He points out that most superintendents could find some places on their courses, far off in the distance where no ball usually lands, to reduce care.

Jack Snyder would like to see a lot more of the target concept, not only through contour mowing but by wild roughs and tricks as well.

"Architects haven't been able to hide sand traps, for example, like in Scotland," he said. "What was called the 'rub of the green' has been eliminated. Maybe we can bring a little of that back within 5, 10, 20 years.

"On the other side, some architects say that the structure of golf doesn't have to return to the past to tighten the game."

Snyder hopes target golf will become a theme new course designs will take into account.

"I think all new courses will be modified slightly with this concept in mind, but not nearly as tight as those private clubs that want to employ it." **WTT**

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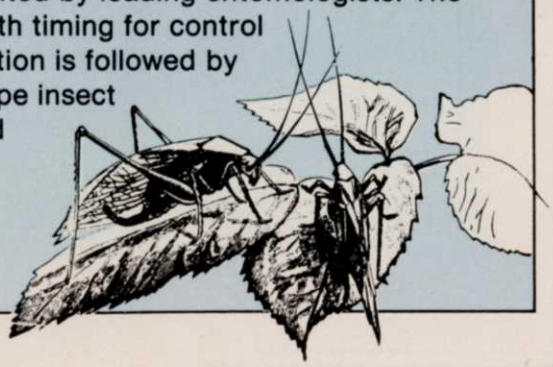
Insect Control Guide

WEEDS TREES & TURF

Turf

by Dr. Harry Niemczyk

The INSECT CONTROL GUIDE will be updated and published each May. For this premier edition, the authors are Dr. Harry Niemczyk, professor of turfgrass entomology, Ohio State University, Wooster, and Dr. R. E. Partyka, director of horticulture, Chemscape, Columbus, Ohio. Photos were contributed by leading entomologists. The Guide was written with timing for control in mind. The turf section is followed by a section on landscape insect control, i.e. trees and ornamentals.



A useful approach to dealing with insect pests of turfgrasses is to consider them as they occur throughout the growing season. While insects are present in the turfgrass environment throughout the year, the key to preventing visible damage from them is knowing the optimal time to apply control measures. These times are keyed to vulnerable periods during the pests life cycle.

Depending on whether the preventive, predictive or curative approach to control is taken, controls for a certain pest may be directed at the different stages of that pest as they occur over the growing season. With the chinchbug, for example, preventive controls may be directed at the overwintering adult in early spring to prevent the laying of eggs, that lead to the damaging summer generation. The curative approach would be to wait until the eggs hatch and then treat for the young (nymphs) during early summer. Whatever the approach, knowing the life cycle of the insect and when the various stages occur, is essential.

The purpose of this guide is to point out some major pests to look out for in 1983 and cover some of the controls that may be used during these times. No endorsement of named products is intended nor is criticism implied for those not mentioned.

LATE WINTER (MARCH)

A. Chinchbug and Bluegrass Billbug - Both of these insects overwinter as adults in the thatch but some move to sheltered sites near buildings or other protected locations. On warm days the insects begin moving about.

When summer damage from chinchbug and/or bluegrass billbug is expected, summer infestations can be prevented with an application of Dursban® (chlorpyrifos) 1 lb AI/Acre (active ingredient/acre) or diazinon 2.5 lb AI/Acre, made as soon as these insects begin to move about. In 1983 this could be as early as the first or second week of March.

B. Grubs — The larvae of this group of pests normally overwinter 6 inches or deeper in the soil. However, during the mild winter of '82-'83, many remained near the surface. This means early grub activity can be expected along with skunks and racoons who will tear up the turf searching for the grubs.

Application of Oftanol® (isofenphos) at 2 lb AI/Acre during March or when frost is gone from the ground, provides control of overwintered grubs as they return to the surface. There is limited confidence that such a treatment will provide adequate control of fall grub infestation. On the other hand, treatment at this time kills overwintering chinchbugs and billbugs and prevents infestation of these insects during the summer.

C. Mole Crickets — The biology of mole crickets varies considerably with the species and is still under study in many areas. Generally, these insects overwinter as adults deep in the soil, however some do overwinter as nymphs. Feeding activity resumes in March. Both adults and nymphs feed at night near the surface on turf roots, organic matter and other insects. During the day mole crickets return to permanent burrows.

In years when feeding of overwintered mole crickets resumes earlier than normal, Oftanol® at 2 lb AI/Acre has been used with some success. Generally, such applications are better made during May.

D. Winter Grain Mite — This dark bodied, red-legged mite actively feeds on grass blades throughout the winter. Symptoms of injury are very similar to those from winter dessication. Damaged areas may also have a gray color appearing as though hit by a late frost.

When unacceptable damage from the winter grain mite is discovered in March, infestations can be readily controlled with a single application of liquid Dursban® 1 lb AI/Acre or diazinon 2.5 lb AI/Acre.

E. Black Turfgrass Ataenius — This golf course pest overwinters as an adult in the soil under debris in roughs or other protected areas. With the mild winter and expectations of a very early spring in 1983, a few may be seen flying about on warm afternoons in early March.

Continued on page 30

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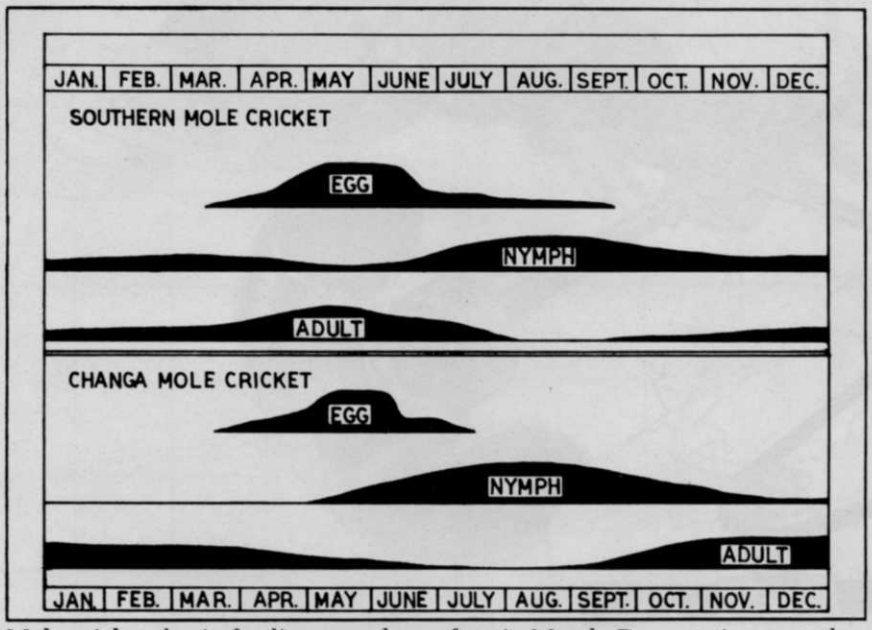

Mole crickets begin feeding near the surface in March. Preventative control would focus on stopping adults before they lay eggs.

Usually this activity begins when crocus starts blooming and intensifies as the bloom of red bud appears.

While an application of Oftanol® in March may be successful in preventing summer infestations of larvae, the probability of successes is increased by waiting until April.

F. Greenbug — The only stage of the greenbug known to overwinter in northern states is the egg. Shiny black eggs deposited the previous fall may be found adhering to grass blades, fallen tree leaves or other debris.

Treatment for greenbug is not appropriate at this time.

G. Sod Webworm — The most common sod webworm species on northern turfgrasses overwinter as larvae in the thatch or upper inch of soil. Feeding does not resume until hibernation (dipause) is broken by early spring warmth.

Treatment for sod webworm is usually not appropriate at this time.

SPRING (APRIL-MAY)

A. Chinchbug and Billbug — As the warm days of May approach, movement of chinchbug and billbug adults increases rapidly. Generally, egg laying begins during May but in 1983 this may occur a month early. Occasionally on warm afternoons, adult billbugs can be seen wandering about on sidewalks.

Generally, application of insecticides to prevent infestations of these two pests (mentioned above) should be completed by the first week in May; before significant number of eggs are laid. This time may vary as much as a week or more depending on the spring.

B. Grubs — Overwintered grubs return to the surface and begin feeding on turfgrass roots in April. Increased activity and damage from moles, skunks and racoons foraging on grubs can also be expected. Feeding by mammals and grubs continues thru May.

A single application of Oftanol® at 2 lb AI/Acre made during April has been successful in controlling overwintered grubs and preventing subsequent infestations during late summer. Application made during May may not provide immediate control, however, prevention of the late summer infestation may be expected.

Infestations of grubs can also be controlled during April or May by spot or general treatment with diazinon 5.5 lb AI/Acre, Turcam® (bendiocarb) 2 lb AI/Acre, Proxol® 8 lb AI/Acre. Golf course superintendents may also use Nematicide/Insecticide (ethoprop) at 10 lb AI/Acre. Irrigation or rainfall should follow such applications, to move the insecticide to the target grub as soon as possible.

Although milky disease products for control of Japanese beetle grubs may be applied anytime there is no frost in the ground. Spring is a good time for such applications because the soil is open and frequent rains help carry the spores deep into the soil. Remember, such products are effective against the Japanese beetle grub only.

C. Mole Crickets — Mature adult mole crickets emerge from the soil in May and engage in mating and dispersal flights. Eggs are laid in chambers hollowed out in the upper 6 inches of soil.

Though some variation in results has been experienced, application of Oftanol® at 2 lb AI/Acre during this time has been generally successful in preventing summer damage. Irrigation following treatment is advisable.

D. Black Turfgrass Ataenius - Adults of the black turfgrass ataenius can be seen flying about in April and are often found in the clipping catchers after early mowing of golf course greens. These adults begin egg laying in early May, or about the time Vanhoutte spiraea first comes into bloom.

Application of Oftanol® during April or May has successfully prevented larval infestations during the summer. Diazinon at 5.5 lb AI/Acre applied to fairways when Vanhoutte spiraea first comes into bloom, kills egg-laying adults and also prevents the development of summer larval infestations.

E. Sod Webworm — Overwintered larvae of the sod webworm

Continued on page 32

The New Trim King.

Greens King precision steps off the green.

From Jacobsen, the company that brought you the Greens King, the first triplex precision greens mowers, comes the Trim King. Possibly the finest, most economical, formal cut triplex mower you'll ever own. Like the Greens King IV, the Trim King is compact and very light on the turf. With a cutting width of up to 70 inches. Like the Greens King IV, the Trim King is fully hydraulic for total control and ease of maintenance. Unlike any triplex mower you've ever ridden, the Trim King will give all your fine areas a clean carpet finish while providing the kind of dependability and engineering quality you've come to expect only from a Jacobsen.

Trim King Features

Out Front Mowing—Cuts ahead of the wheels to eliminate tracking.

Hydraulically Driven Reels—Cuts wet or dry grass easily. Reels can be reversed from the operator's seat. Instant backlapping.

Hydraulic Variable Traction—Eliminates marking and turf damage. Provides variable traction speed to match terrain conditions.

Grass Catchers—Seven bushel capacity. Easy on and off. No clipping spillage.

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begin feeding as soon as the grass begins to grow. Usually damage is insignificant, but areas which do not green-up may be infested. Infested areas frequently have probe marks from starlings who feed on the larvae.

When necessary, a wide range of insecticides including diazinon, Dursban®, Proxol® (trichlorfon), Aspon, Sevin® (carbaryl) and others applied at labeled rates may be used to obtain control.

F. Black Cutworms — Moths of the black cutworm begin laying eggs on golf course greens and other turf areas in the spring. These eggs hatch producing larvae that feed on grass blades during the night. While visible damage is uncommon on home lawns, damage can be significant on golf course greens in late May.

Generally, the insecticides effective against the sod webworm (mentioned above) are also effective against cutworms. The principle of controlling these pests is to apply the insecticide (late in the afternoon) to the grass and allow the cutworm to feed on and come in contact with the treated foliage. Irrigation following liquid application is therefore not advisable.

G. Greenbug - Greenbug eggs begin hatching as early as April but significant infestations do not develop until later in the year. Aphid numbers are too low to detect.

H. Winter Grain Mite — Damage from this mite is often first noted in April when home lawns are receiving spring pesticide and fertilizer applications. By late May, the mites will have laid their eggs and died. Mites do not appear again until the eggs hatch in October.

If treatment is necessary, diazinon or Dursban® will provide control.

SUMMER (JUNE-AUGUST)

A. Chinchbug — Chinchbug eggs begin hatching in May and continue into June when bright red nymphs appear. The number of chinchbugs increases rapidly reaching a peak during July when northern lawns can sustain severe damage. During August the nymphs molt into adults that mate, lay eggs and produce a second generation. Some northern areas have only one generation each year.

A wide range of insecticides such as Dursban®, diazinon, Aspon®, and Sevin® may be used at labeled rates to control existing infestations. Treatments should be applied *before* injury is severe, otherwise, damaged areas may not recover.

B. Billbug — Billbug larvae feed in grass stems during June but move to the plant crowns and roots during July. This feeding causes brown spots that frequently resemble the symptoms of some fungus diseases. During August the larvae burrow deeper into the soil to pupate and transform into adults.

Infestations discovered during this time may be treated with applications of insecticides such as diazinon, Turcam,® Proxol® at rates used to treat existing grub infestations. Irrigation or rain following application is needed for optimal results. If larvae are feeding in the root zone, control may be difficult to achieve. Oftanol® applied during June controls feeding larvae and also provides control of late summer grub infestations.

C. Grubs — By June grubs have stopped feeding and are in the pupal stage 3-4 inches deep in the soil. Beginning in mid-June and continuing through July, the adults of various species emerge and burrow into the soil to lay eggs. Hatching and appearance of young larvae occur during July and August.

Oftanol® applied in June provides control of developing grubs during August as well as chinchbugs and/or billbug larvae present in the turf at the time of application. Existing infestations of grubs found in August may be treated with Proxol®, Turcam®, Oftanol®, diazinon or Nematicide/Insecticide (for golf courses) at standard label rates. At least 0.5 inch of irrigation following treatment maximizes insecticide effectiveness.

D. Mole Crickets — Mole cricket egg laying continues through mid-

Continued on page 36

Greenbug damage to bluegrass, but not fescue, under tree canopy.

Surflan® and Roundup®. A powerful combination with beautiful results.

When you combine the dependable residual control of Surflan® with the knock-down power of Roundup,® the result is season-long control of troublesome weeds and grasses. And that can be beautiful. You simply won't find a more effective tank-mix for use in noncropland areas, Christmas tree and ornamental plantings, landscaped areas, and highways.

With Roundup, you can have weed and grass kill right away. Then Surflan follows up with six to eight months of dependable residual control, the real key to a solid, long lasting weed control program. A preemergence herbicide, Surflan meets crabgrass, barnyardgrass, fall panicum, pigweed, johnsongrass, foxtail, and many others head-on, before they ever really get a chance to grow.

By being a weed's worst enemy, an effective tank-mix is the best friend flowers, trees, plants, or shrubs can have. And that's the real beauty of Surflan and Roundup. For Surflan, see your Elanco distributor. ELANCO

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Surflan® ™

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How Dyclomec™ helps turn problem areas

With this unique herbicide you can do much more than temporarily kill vegetation along fence rows, in woody ornamental beds, around tree trunks, etc. You can actually turn these areas into cosmetic highlights.

Dyclomec is surely the most exciting herbicide ever offered to the professional groundskeeper who is dedicated to manicured landscaping but has to live within a hard-nosed budget.

Obviously, there is no way you can live with a lot of unsightly plant residue growing along fences, in ornamental beds, etc. So you've probably been using a quick-acting contact herbicide, since mowing or hand trimming is out of the question.

But this has to be frustrating for you, because it leaves a lot of ugly, dead vegetation; futhermore, new seeds germinate and the vegetation grows right back. And, to add insult to injury, the cost of a contact herbicide is nothing short of exotic. Dyclomec can make these aggravations ancient history.

Dyclomec enables you to turn these eyesores into sharply defined highlights that are absolutely beautiful because they will be absolutely blank ... just pure mother earth in all her natural, naked splendor.

... And you'll do it economically and efficiently because one application of Dyclomec gives season-long control.

But wait! To truly maximize the effectiveness and efficiency of Dyclomec as a tool to achieve the manicured look, you need to thoroughly understand what it is; how it works; and how to apply it. Dyclomec is a professional product and requires professional treatment.

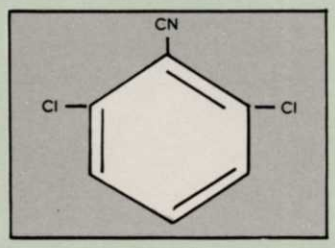
What is Dyclomec?

Dyclomec is 2,6-dichlorobenzonitrile. The formula is $C_7H_3C1_2N$. The one word that best describes this unique herbicide is *sublimation*. The material goes to a vapor stage without going through a liquid stage. It is activated by heat in combination with soil moisture, and is virtually insoluble.

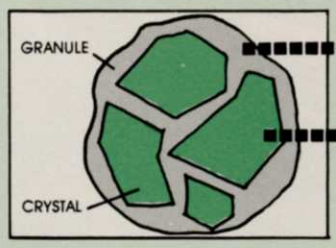
This remarkable compound is milled into razor-thin crystals which are uniquely processed by PBI/Gordon to make a precise granule.

How Dyclomec Works:

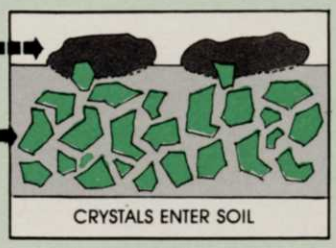
Dyclomec granules are spread on the surface. Moisture carries the Dyclomec crystals from the granule into



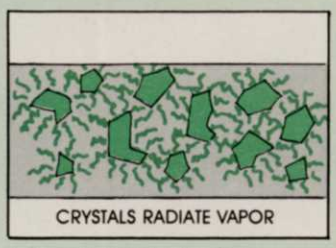
1. Dyclomec is 2,6-dichlorobenzonitrile. The formula is $C_7H_3C1_2N$. This unique herbicide goes directly to a vapor stage without going through a liquid stage. It is activated by heat and soil moisture.



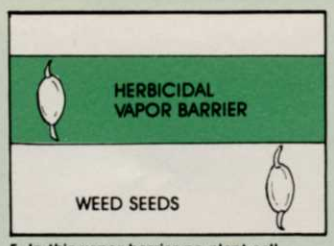
2. This remarkable herbicidal compound of razor-thin crystals is uniquely processed by PBI/Gordon to make a precise granule.



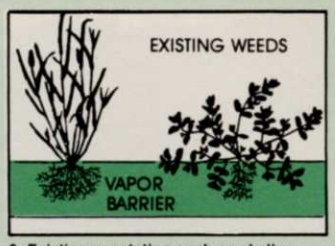
3. Granules are spread on soil surface. Moisture carries the Dyclomec crystals into the soil approximately two inches. Because of adsorption by soil particles, lateral movement is usually no more than one inch.



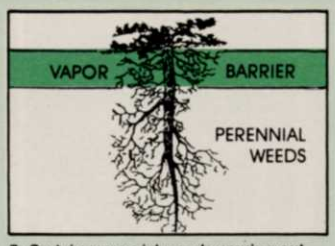
4. Temperature and soil moisture activate the Dyclomec crystals and they begin to radiate a herbicidal barrier. This continues for an entire growing season, and the spent crystals disappear, leaving no residue.



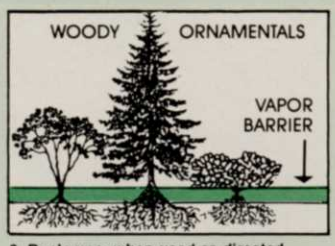
5. In this vapor barrier no plant cell division can occur. Seeds trying to germinate in the barrier will die. Sprouts below this zone will be killed as they try to penetrate the barrier.



6. Existing vegetation such as shallow-rooted grasses and annual weeds having root structures in this barrier will likewise be affected and die after two to three weeks.



7. Certain perennial weeds coming out of dormancy and attempting new growth within the Dyclomec barrier will run into the same dead end: they will be killed by the vapor.



8. Dyclomec, when used as directed, does not affect woody ornamentals, shrubs and trees that have deep roots extending well below the herbicidal vapor zone.

the turf professional into beauty spots...

the soil to a depth of approximately two inches. Because of their insolubility and adsorption by soil particles, they tend to remain in this upper soil level under most conditions. Lateral movement is limited to approximately one inch.

Temperature and moisture activate the Dyclomec crystals, and they radiate a vapor that creates a herbicidal barrier. This radiation continues throughout the growing season, and then the crystals become totally spent.

... In this Dyclomec herbicidal vapor barrier no plant cell division can occur. Any vegetation such as grasses or shallow-rooted annual weeds which have their root structures within this barrier will die.

Furthermore, as weed seeds in this zone attempt to germinate, they are killed. In addition, sprouts developing below this zone will be killed as they try to penetrate the barrier. A number of perennial weeds coming out of dormancy run into this same dead end.

On the other hand, plants such as woody ornamentals, shrubs and trees are not affected by Dyclomec since their root structure is below this herbicidal vapor zone.

Call our Technical Service Department

If you have any questions about where and how to use Dyclomec,* we invite you to call our Technical Service Department.

TOLL-FREE 1-800-821-7925
In Missouri 1-800-892-7281

*Dyclomec is not available west of the continental divide.

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A handy way to apply Dyclomec

Uniform distribution is the most important factor in Dyclomec's effectiveness, so PBI/Gordon offers a patented, gravity-flow applicator called *Acme Spred-Rite® G* that is ideal for applying Dyclomec in tightly circumscribed, manicured areas.

Tilt the applicator down and granules tumble into a series of stubby, deflector spikes in the head. Some granules slip through the spikes, others bounce off; the result is a predictable pattern of granules.

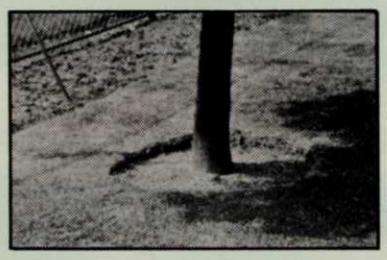
Hold the Spred-Rite three feet above ground to get the widest swath, 30 to 36 inches. Hold the head closer to the ground to get a narrower swath. Turn the head sideways for a sharply delineated edge. Remove the Spred-Rite head to get the finest line of vegetation control.

Two interchangeable orifice disks, included, regulate the flow of granules through the tube and further sharpen the precision with which the Spred-Rite performs.

- Has no moving parts.
- No metal parts to corrode or rust.
- Lightweight: 6 oz. empty; 6 pounds full.
- Can be used to spread granular herbicides, fungicides, insecticides, fertilizers.

Spred-Rite® is a registered trademark of PBI/Gordon.

Where are you going to use Dyclomec?



DYCLOMEC™

LANDSCAPING HERBICIDE

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557-383

Circle No. 145 on Reader Inquiry Card

Turfgrass Insect Identification Quiz

By Dr. Harry D. Niemczyk, Professor of Turfgrass Entomology, Ohio Agricultural Research & Development Center, Wooster, Ohio

Quiz yourself. Answers are on the next page.

A. _____

B. _____

C. _____

D. _____

Photo courtesy Dr. H. Tashiro

E. _____

Photo courtesy Dr. J.A. Reinert

F. _____

G. _____

Photo courtesy Dr. H. Tashiro

H. _____

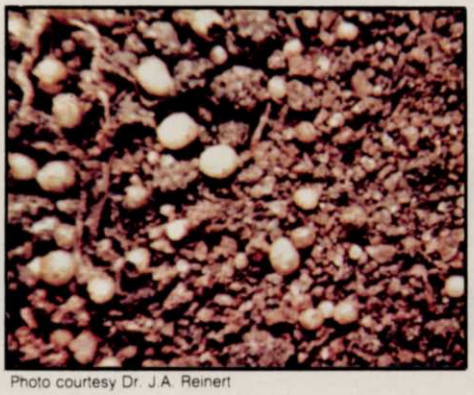

Photo courtesy Dr. J.A. Reinert

I. _____

J. _____

When your job depends on stopping gypsy moths and other pests, depend on ORTHENE.

ORTHENE® Tree & Ornamental Spray is the professional way to kill gypsy moth larvae... plus a wide range of other insects. It kills on contact, then keeps killing with an effective residual action.

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YOU CAN DEPEND ON IT.

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June. Depending upon location, eggs hatch from early June through August with peak hatch during June.

In areas where damage occurred previously, sprays of Baygon® (propoxur) or Sarolex® (diazinon) or granular Mocap® (ethoprop) at labeled rates have shown effectiveness when applied in early June. Irrigation (½ inch or more) should be applied after treatment. Bait formulations with Baygon®, Dursban®, Malathion or Sevin® have also been effective when applied during late June. Irrigation should not be applied for 3-4 days after application of baits.

E. Black Turfgrass Ataenius — Eggs laid by beetles during May hatch in June and the larvae begin feeding on the turf roots immediately. From late June to mid-July, symptoms of injury include wilting of the turf, in spite of irrigation. In July, larvae move deep into the soil, pupate and emerge as adults. In states such as Ohio, these adults lay eggs during August producing a second generation of larvae capable of damaging turf.

If a preventive program was not applied, existing infestations may be spot or generally treated with Proxol®, Turcam®, diazinon or Nematicide/Insecticide at label rates.

F. Black Cutworm — By June larvae of the black cutworm are large enough to cause visible damage to golf course greens. These larvae pupate in the soil or thatch and emerge as moths that lay eggs on the turf in July. The larvae of this second generation are present on greens in August.

Cutworm larvae can be controlled with a wide range of insecticides such as Dursban®, Proxol®, Aspon®, Sevin®, and others, at labeled rates. Irrigation following liquid applications is generally not advisable.

G. Greenbug — Damaging populations of greenbug can occur from June through August. Populations and incidents of damage frequently varies from area to area, even within a city. Symptoms of injury include turf under the dripline of trees and in open areas having a burnt orange color. When such symptoms are seen, numerous aphids (40 or more) may be seen on a single grass blade. Close examination of damaged turf is necessary because the aphids are small. If left untreated, a heavy infestation can kill the turf.

Greenbug infestations may be controlled with liquid treatments of Dursban®, 1 lb AI/Acre or diazinon at 2.5 lb AI/Acre. If reinfestation occurs following treatment with these insecticides, Orthene (acephate) EC at labeled rates has been effective.

FALL (SEPTEMBER-OCTOBER)

A. Chinchbug — In northern areas such as Ohio, the second generation of chinchbug is at peak numbers in September. Nymphs complete their development to adults by late October. Most chinchbugs overwinter in the turf but some move to protected areas before winter.

Generally, infestation levels at this time are not high enough to warrant the use of insecticides. Early fall rains and infection by a parasitic fungus usually provides sufficient suppression.

B. Billbug — During September billbug adults that developed from summer larvae are often seen wandering about on sidewalks, driveways or other paved surfaces. Before winter, these adults seek shelter in thatch, along sidewalk edges, or near the foundation of houses and overwinter there. However, if many, if not most, overwinter in the turf.

C. Grubs — Most species of grubs are in the third of their 3 stages of development and are feeding actively. When soil temperatures decrease in late October the larvae burrow deep into the soil to overwinter. However, during the mild winter of 1982-83, the larvae remained in the top 3 to 6 inches of soil.

Treatments of existing grub infestations can be accomplished as late as early-to mid-September using standard grub insecticides and sufficient (½ inch or more) irrigation. Treatment after this time may or may not kill the grubs before they move deeper into the soil to overwinter. Whenever treatment is applied, the grubs should be in the top one to two inches of soil.

D. Black Turfgrass Ataenius — By September adults of the current generation begin to fly into protected areas, such as golf course roughs, to overwinter. Larvae that have not completed development to adults before frost are killed.

E. Mole Crickets — Mole cricket nymphs develop through the summer and most become adults by fall. However, recent studies in Florida show some egg laying continues throughout the year.

F. Greenbug — Severe infestations of greenbug have been known to occur as late as the first week of December. Areas having a history of infestations should be reexamined when mild temperatures extend late into fall. Heavily infested, turf probably will not survive through winter.

Late fall infestations may be controlled with the same insecticide used to control the pest during the summer.

ANSWERS TO TURF INSECTS

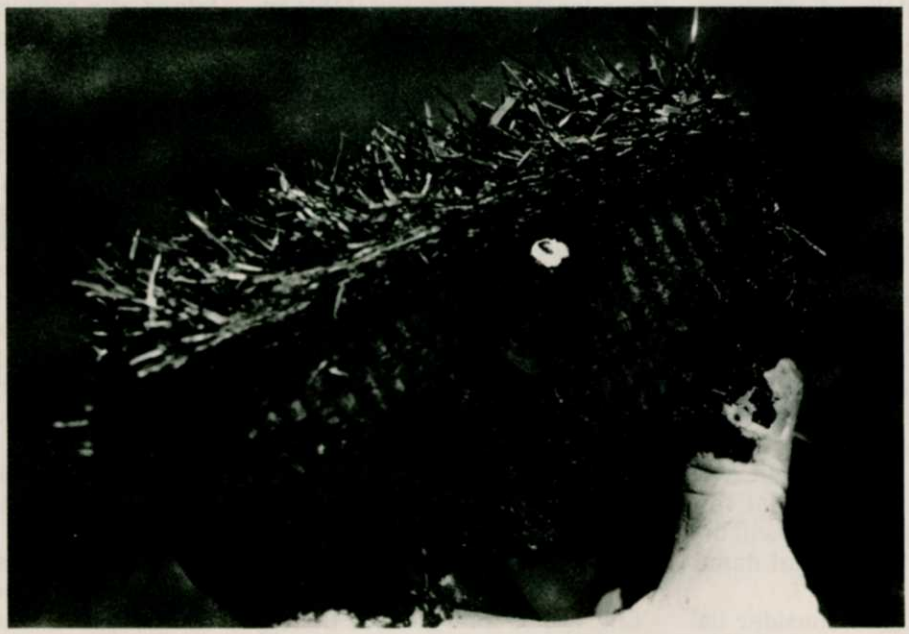
A. masked chafer (adult)
B. hairy chinchbug (nymph)
C. bronzed cutworm (larva)
D. winter grain mite
E. hyperodes weevil (adult)
F. Rhodesgrass scale
G. Japanese beetle (adult)
H. hyperodes beetle (larvae)
I. ground pearls
J. hairy chinchbug (adult)

Continued on page 40

No matter how tough the infestation, or how late you apply it...

TURCAM® INSECTICIDE

is Tough on Grubs



TURCAM® gets to the root of your grub problem. Because grubs are active under the thatch covering of turf, you need a product that will get through this layer to control grubs in their active stage of destructive root degeneration.

If no grub preventative was applied, in early summer you may find isolated grub infestations. TURCAM's new advanced carbamate formulation goes to work fast to handle grubs where they live, providing effective control over white grubs and 40 other turf and ornamental pests.

TURCAM BENEFITS

- **will not damage turf or ornamentals**
- **will not tie up in thatch layer**
- **is odorless**
- **is suitable for use in liquid systems**

TURCAM is sold to and used only by professional applicators. It is easy to mix, and can be applied with conventional hand- or power-operated sprayers.

For further information on TURCAM, including full labeling and recommendations for use, please contact your local distributor, or write to:

BFC Chemicals, Inc.,
4311 Lancaster Pike
P.O. Box 2867
Wilmington, Delaware 19805

Circle No. 103 on Reader Inquiry Card

Landscape

by Dr. R.E. Partyka

Insect damage to woody ornamental can vary from the subtle insignificant to widespread destruction that eventually results in death of plants. There are many plants included in the ornamental area with a varied assortment of insects on each species. This results in a relatively large number of insect pests that can be destructive to ornamentals. Fortunately, all of these insect pests do not appear at one time or in one year, as many of them are cyclic.

Insect control is dependent on early recognition of the specific insect, its significance in the area, its life cycle or biology, a practical approach to control if needed and materials to use on the pest and their effect on the environment.

Early recognition is important in preventing serious damage to the plant. The majority of the space devoted to this article will dwell on recognition. Once we have established the insect is on a plant, we need to evaluate its potential for severity and what measures will be employed to minimize plant damage.

A second step is to consider its significance. Is it important at this time and what will happen in the future if nothing is done? How does the client view the pest problem? Are holes or webbing so obnoxious that a high degree of control is needed? Also what time of the year does the pest develop?

A late season defoliator may be annoying, but does little harm to a plant that is essentially shutting down for the season. But if this annoys a person who owns the plant, then appropriate suppressive measures must be applied at the proper time.

An early season defoliator may result in foliar devastation but new leaves will form and mid- to late-season appearance will approach that of normal plants.

Continued defoliation each year may be harmful to the plant and results in a second onslaught of problems at some late date. The person diagnosing the problem must understand the consequences of minimal control and the client's feelings toward the problems must be put in perspective.

Life cycles

Life cycles and general biology of the insects are important in determining sensible control strategies. Often times, early control materials can be used in reducing the pest and are safer to the applicator and environment. Treatment at the appropriate stage of development can result in good suppression with a safer material of relatively low toxicity. In some cases, reasonable control can only be obtained at a certain stage in the life cycle of the insect and this becomes critical if one is to obtain satisfactory results.

A practical approach to control needs to be resolved with certain pest problems. The nature of a life cycle and certain predisposing factors that may influence the pest outbreaks need to be considered and evaluated. In some situations, there are no practical means to control because of the advanced nature of the problem at the time. Therefore, removal and starting over again may be the best approach. Again a full understanding between diagnostician and client is important.

Materials to use on a specific pest need to be determined based on research results, climatic conditions, size and age of the pest, plant reactions, equipment capabilities, area where the material is to be used and effects on other forms of life. It should be understood that 100 percent control of a pest is not practical or possible. Shifting a delicate balance where and when it is needed is the prime aim of pest control. Therefore, many other factors need to be considered in maintaining strong healthy plants that are capable of withstanding a degree of insect injury but can recover in a short period of time with minimum visual symptoms and little impact on total plant vigor.

What to look for, where, and suppressive measures to use should be checked in your area by contacting the local county extension agent, farm advisor, or the State University. Climate variations and num-

Continued on page 44

Fall webworm larvae produce silk to form a web where they feed. One to four generations can take place in the U.S. per year.

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ber of generations of a pest are important when providing the service to a client for optimum results and satisfaction.

Pests and control by season

DORMANT PERIOD: This appears to be an ideal time to control insects that survive from season to season in the egg stage or an immature form that can be smothered by the use of a highly refined oil, generally referred to as superior oil and often times called dormant oil. Its mechanism of action is to exclude oxygen to the insect and not damage the plant. However, oils will not control eggs laid in large masses that are engulfed in a protective layer of hair, wax, or other materials or have limited breathing pores.

I. Scales

A. *Armored Scales* — oil controlled or else wait for the crawler stage.

1. Oyster shell — Found on a wide assortment of plants. Characteristic to look like oysters on a branch. Brown and gray scale. Brown has two generations a year which often involves additional sprays in the foliage stage.
2. Cottony Maple Scale — Small immature females on younger wood. Most common on Silver Maple and Linden — One Generation.
3. Obscure Scale on Oak — Often overlooked because it blends in well with the natural bark. Ideally named. One Generation.
4. Pine Needle Scale — Obvious white flecks on needles. More than one generation in many areas makes this scale difficult to control.
5. Euonymus Scale — Obvious white flecks on leaves and not as obvious on the woody tissue. Multiple layers makes control difficult. Multiple generations — female scale resembles oyster shell scale when initially developing.
6. Euonymus Scale (Winged) — A scale on *Euonymus elatus* types that blends in so well with the natural bark that it is often missed and not recognized until segments of the plant dies.
7. White Peach Scale — A very characteristic growth on stone fruit, lilac and privet. Females are circular, white tinged with lemon yellow center, males are elongated and white. Multiple generations in the south.
8. San Jose Scale — At one time a severe pest problem on many plants. It appears to be on the increase in some areas. Multiple generations exists.
9. European Elm Scale — Primarily on elms. Females are oval, reddish brown and surrounded by a white cottony fringe — One Generation.
10. Camellia scale — Females are elongate, oval and dark brown to almost black in color. They somewhat resemble oyster shell scale. Overlapping generations exist.
11. Juniper scale — White round convex females with yellow center on juniper but arborvitae, incense cedar and cyress attacked — One Generation.

B. *Unarmored or Lecanium scales* — oil control is minimal unless applied at critical stage in life cycle. In general major direction of control is toward the crawler stage of the life cycle, with materials such as acephate, bendiocarb, diazinon, malathion and dimethoate.

1. Fletcher Scale — Common on taxus. Sometimes called Taxus Lecanium. Also on arborvitae and juniper — One Generation. Crawlers occur in July, feed on foliage then on bark.
2. European Lecanium — Found on Ash, Oaks, Pine and fruit trees. Crawlers active in June — feed on leaves. One or two generations.
3. Magnolia Scale — One of the largest scales. Crawlers active in late summer or early fall. One Generation. Sooty mold common due to heavy honey dew formation.
4. Globous scale — A scale of minor importance but injurious to prunus species.
5. Tulip Tree scale — Large scale that feeds on the bark. Crawlers active in late summer. One Generation.
6. Wax Scale on Euonymus — Scales with thick heavy covering of white wax over their bodies. Common in warm climates on many plants. May have more than one generation. Highly reproductive. Control in crawler stage best.

II. Eggs in Singles or Single Layers — can be suppressed with superior oils.

1. Fall Canker Worm — Eggs deposited late in the fall and controlled by superior oil. One Generation.
2. Eriophyid Mites (Ash flower gall, Bladder gall mite maple) — Mites or eggs that are found under or around buds where they overwinter. Can be suppressed with superior oils. Pear leaf blister mite, ash flower gall, arborvitae tip dwarf mite, maple bladder gall mite fall in this group. In most cases — One Generation.
3. Aphids — Soft bodied insects that over winter as eggs on specific hosts in northern climate. Oils will help suppress development on treated plants. Rapid build up on other plants often necessitates the need for additional treatments during the growing season.
4. Spider Mites — Species such as spruce spider mite or red mite on apple that overwinter as eggs on the needles or woody tissue can be controlled with oils. This is different from the two spotted mites that over winter as hibernating females in plant duff. Multiple Generations.

III. Eggs in Masses — cannot be suppressed with superior oils. Control directed to larval stage of life cycle.

1. Spring Canker Worm — Eggs deposited on masses on bark early in the spring.

continued on page 46

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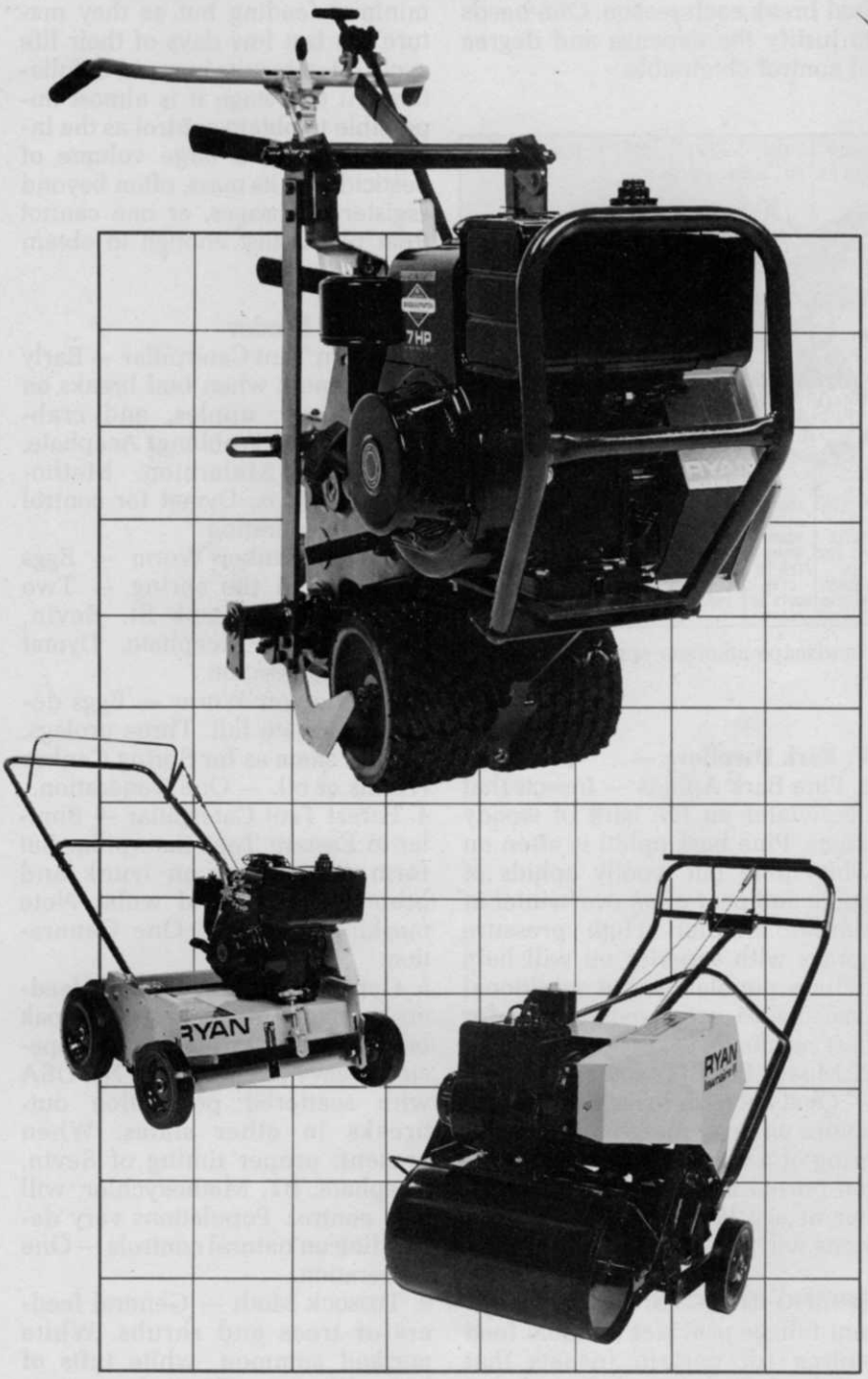

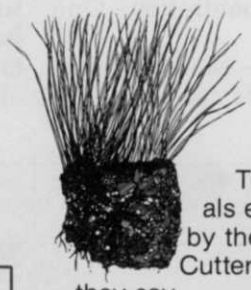

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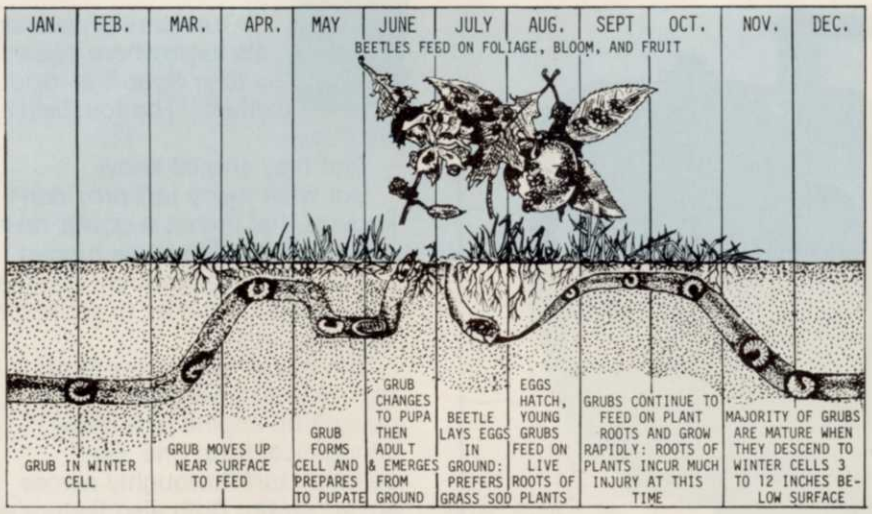
2. Gypsy Moth — Masses of eggs in a felt-like media of insect hairs. One Generation.
3. Eastern Tent Caterpillar — Masses of immature embedded in a varnish like material that is resistant to oil pentration. One Generation.
4. Tussock Moth — Masses of eggs cemented to the old cocoon.



Life cycle of the Japanese beetle tells the landscape manager spring soil treatments may reduce summer foliage damage.

IV. Woody Galls — life cycles and timing very important for control.
1. Cooley Gall (Adelgids) — Galls are empty at this stage but the immature are present at base of needles where oils can give a degree of control. But you need to watch for needle color shift with oil. Better to use Sevin, Malathion or Dursban on prime plants, just prior to bud break.
2. Eastern Gall (Adelgids) — Old brown galls are empty at this stage but immature are present at base of needles where oils can give control. Coverage and penetration important. Note Cooley gall controls.
3. Horned Oak Gall — Common on pin oak and other black oaks. Complicated life cycle. Horned oak gall has a two year cycle and oils will give a degree of suppression if used on a regular basis.
4. Miscellaneous Galls (Succulent Oak Leaf Gall, Oak Flower Gall) — Many are difficult to control because of unknown or complicated life cycles. The ones that form on new growth and related bud tissue can be suppressed to a degree with superior oil when it is used prior to bud break each season. One needs to justify the expense and degree of control obtainable.

V. Bark Dwellers —
1. Pine Bark Aphids — Insects that overwinter on the bark of woody stems. Pine bark aphid is often on white pine but woolly aphids of apple and pear often overwinter in similar manner. High pressure sprays with superior oil will help reduce population but additional insecticides are needed later for best results.
2. Mealy Bugs (Taxus mealy bug) — Oval sluggish insects with short spines on body margins and a covering of a mealy white powder often buried in a mass of cottony fiber at egg laying time. Oil emulsions will aid in control.

SPRING INSECTS: Tender succulent foliage provides an ideal food source for certain insects that hatch with some of first warm weather of spring. This appears to correlate well with plant development and degree day heat-unit accumulation. These spring feeders, when present in large numbers, can cause severe defoliation in a matter of days. The young stages are often unnoticed because of minimal feeding but as they mature the last few days of their life cycle often results in rapid defoliation. At this stage it is almost impossible to obtain control as the insects requires a large volume of pesticide for its mass, often beyond registered dosages, or one cannot treat plants fast enough to obtain control.

I. Foliage Feeder
1. Eastern Tent Caterpillar — Early development when bud breaks on wild cherry, apples, and crabapples. (Note Webbing) Acephate, Bt, Sevin, Malathion, Methoxychlor, Dylox, Dymet for control — One Generation.
2. Spring Canker Worm — Eggs deposited in the spring — Two prolegs — Control Bt, Sevin, Methoxychlor, Acephate, Dymet — One Generation.
3. Fall Canker Worm — Eggs deposited in late fall. Three prolegs. Control same as for Spring Canker Worms or oil. — One Generation.
4. Forest Tent Caterpillar — Similar to Eastern Tent Caterpillar but form silken mat on trunk and branches instead of webs. Note markings on back. One Generation.
5. Gypsy Moth — Voracious feeders on many plants preferring oak but damaging to many other species. Heavy population in NE USA with scattered population outbreaks in other states. When present, proper timing of Sevin, Acephate, BT, Methoxychlor, will give control. Populations vary depending on natural controls — One Generation.
6. Tussock Moth — General feeders of trees and shrubs. White marked common, white tufts of hair. Western Tussock moth a

Continued on page 50

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Rubigan has a mode of action involving three or more sites of inhibition (a multi-site inhibitor). Years of successful use outside of the U.S., as well as trial usage in the U.S., have shown that susceptible fungi commonly found in turf have not been able to develop resistance to Rubigan.

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Rubigan is a foliar-applied, locally sy temic fungicide. It's absorbed almost immediately into leaf tissue an isn't susceptible to washoff by rain or irrigation once the spray has drie While the spray is drying, the active ingredient sets up shop inside the plant where it can't be washed out Disease protection begins immediately after application.

Excellent turfgrass safety.
No adverse effects or discoloration

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Circle No. 115 on Reader Inquiry Card

Landscape

Canker worm larvae can defoliate entire trees and then swing to nearby trees on strands of silk.

problem in Mt. States. White marked may have several generations. Most materials listed for previous feeders are effective.

7. Yellow Necked Caterpillar — Yellow and black striped caterpillar with prominent yellow spot just back of the head. Feed in groups and raise head and tip of abdomen when disturbed — One Generation generally. Sevin, Acephate effective.

8. Juniper Web Worm — An insect that may cause severe damage before it is recognized — Reddish brown caterpiller overwinters in the frass on branches. Penetrating sprays of Acephate, Diazinon, Sevin, Dymet in early spring or early fall needed for control. One Generation.

9. Green Stripe Maple Worm - A limited insect on Maple in river bottoms but a major defoliator when present. Two Generations — with the second being most damaging — Sevin, Acephate, Methoxychlor, Dymet.

10. Elm Leaf Beetle — Larvae feed on the lower leaf surface causing them to die and drop prematurely. More than one generation — Sevin, Methoxychlor, Dymet and Acephate for control.

II. Sawflies and Leaf Miners

1. European — Eggs are deposited in needles in late fall. Look for symptoms on needles to determine potential problem. Use Acephate, Methoxychlor, Sevin in early stages. Other conifer sawflies develop during the summer.

2. Birch Leaf Miner — Small black fly-like wasp present when leaves are ½ grown signifies time to apply a protective control. Use Sevin, Diazinon, Acephate, Dimethoate before egg laying. After eggs are deposited, use Acephate or Dimethoate.

3. Arborvitae Leaf Miner — Small green caterpiller with black head that overwinters in mined leaves. Look for holes in Terminal Tissue. Adults are small moths. One Generation. Direct sprays in spring - Acephate

4. Locust Leaf Miner — Many plants skeletonized by adults. Mining occurs on black locust — Two Generations. Limited materials for control. Lindane and Dibrom are listed.

5. Other Sawflies — Skeletonized foliage or consumed foliage. Need to watch for damage as insects are sporadic. Most materials listed will give control.

III. Sucking Insects

1.Aphids — Often present on new growth. Use Malathion, Diazinon, Dymet, Acephate, Bendiocarb. Acephate and Bendiocarb have longer residual but new generations build quickly. Need to watch closely.

2. Spider Mites — Common on evergreens. Need to watch for off-color foliage. Spruce spider mite may be a problem at this time. As weather warms up, two spotted spider mite becomes more common. Kelthane, Malathion, Vendex, Dymet

3. Plant Bugs and Leaf Hopper — Common on honey locust as new growth unfolds. Sevin, Dymet, Diazinon.

4. Lace Bugs — Found on hackberry, oak, Mt. Ash, Sycamore Elm, Azalea. Wings that appear lace-like due to many veins. Can cause much leaf browning. Several Generations — When severe — Use Malathion, Sevin, Acephate, Dymet, Methoxychlor.

IV. Borers

A. *Clear Wing* — Early season emergent holes. Use pheromone traps to detect activity. Protect new wood with Dursban or Lindane.

B. Beetle

1. Bronze Birch Borer — Severely damages white birches — Plant vigor is a factor but protection possible with Bendiocarb or Lindane — Timely application needed.

2. Flat Head & Round Head — Enter in wounded or weakened plant tissue. Little to no control once tissue is invaded. Plant vigor is major control.

V. Scale

1. Oyster shell crawlers — The early crawler stages of euonymus, oyster shell, oak kermes, golden oak and pine needle scale can be active at this time so plants should be carefully watched for activity. Acephate, Sevin, Diazinon, Malathion for control - Multiple Generations.

VI. Shoot & Tip Moths

a. Pine Tip shoot moths

b. Mugo pine shoot moth

Several species of shoot and tip moths needed to be treated for at this time of the year. Timing important and local pests need to be checked. Several materials are suggested including Sevin, Acephate, Dymet, Lindane, Bendiocarb and Dimethoate.

SUMMER INSECTS: These insects feed on mature or near mature foliage. Injury at this time may reduce the amount of sugar or carbohy-

Continued on page 52

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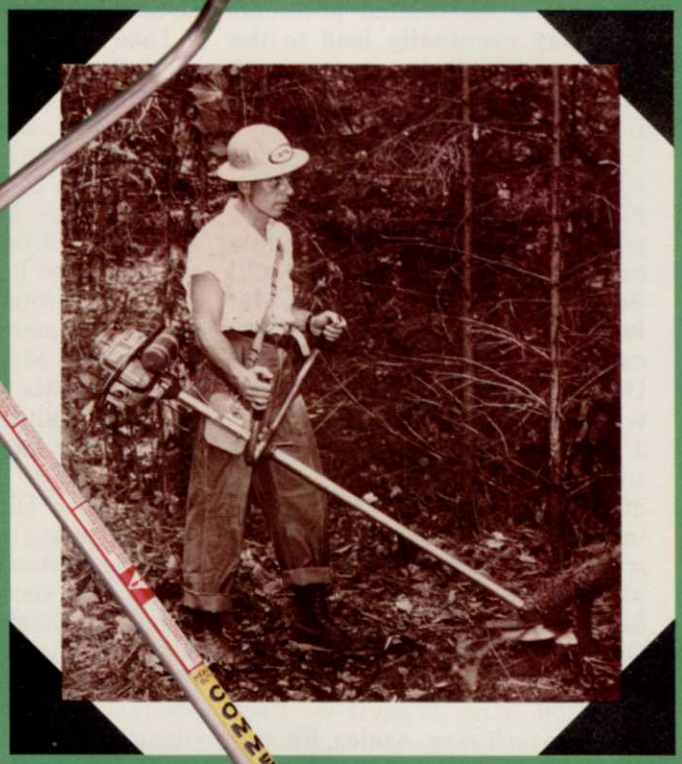

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drates the plant can store up for bud development and winter survival in colder areas of the country. This may leave the plant in a weakened condition making it more suceptible to winter damage or other stress related problems that may eventually lead to the failure of the plant.

I. Foliage Feeders

1. Bag worms - Most common on narrow leaf evergreens but can be found on many other plants when population levels rise. Reasonable control can be obtained with Sevin, Diazinon, Acephate, Malathion, Methoxychlor, Bendiocarb when they are small but Dursban and Acephate are needed when more mature.
2. Japanese Beetles - Early to midsummer favors the first emergence of this colorful but destructive insect. Favored host of prunus, apple, rose, elm and many other plants need to be protected with Sevin, Bendiocarb, Methoxychlor, Diazinon. A long residual is important.
3. Black Vine Weevil — Leaf notching on Taxus, Azalea, Rhododendron and numerous other plants in the landscape suggests weevil feeding. Black vine weevil common but several others may be present. Night feeders — Larval stages feed on roots. Control adults with Acephate, Bendiocarb, Lindane.
4. Imported Willow Leaf Beetle — Most willows attacked by this insect. Several generations. Sevin, Acephate, Methoxychlor — Timing important.

II. Sucking Insects

1. Lace Bugs — Off color and stipple pattern on leaf is common with shiny black fecal residue on under side of leaf. Common on Azalea, Rhododendron, sycamore, Pyracantha. Use Malathion, Acephate, Sevin, Dymet, Dimethoate.
2. Spider Mites — Hot weather will favor the build up of these insects often found on juniper and spruce but many other plants are susceptible. Many regular insecticides give little to no control of spider mites. Other materials must be used such as Dicofol, Dymet, Vendex etc.
3. Aphids — Different species are present during the growing season. Must be alert to build up, especially on new succulent tissue. Use Acephate, Diazinon, Malathion.
4. White Flies — Often found on the under sides of leaves of Azaleas, privet and foundation plants that result in a black sooty mold growing on the honey dew. Difficult to control insect due to life cycle. Acephate, Dymet, Diazinon, Dimethoate, plus others.

III. Scale Insects, Crawler Stages

1. Cottony Maple Scale - Cottony masses on silver maple and others. Wait for all eggs to hatch for best control. Acephate, Diazinon, Sevin, Malathion.
2. Lecanium Scale-Wait for crawler stages to be active for control. Timing important — the materials are listed above.
3. Oyster Shell Scale-Watch for branch dieback or slow leaf development.
4. Pine Needles Scale

IV. Leaf Miners, Skeletonizers

1. Solitary oak leaf miner — Various leaf miners are active at this time. Early recognition and use of a protectant insecticide or use of a systemic material is needed.
2. Leaf Skeletonizer — These insects may be annoying in areas where an oak population exists — Two generations are often found. Similar insects occur on birch and other plants. The larvae that drop from a web and the white cocoons are annoying. Timing is more important than control materials of Sevin or Diazinon.
3. Needle Miners — Needles cut off and webbed together making branches unsightly. Use Sevin or Acephate early in spring and midsummer.

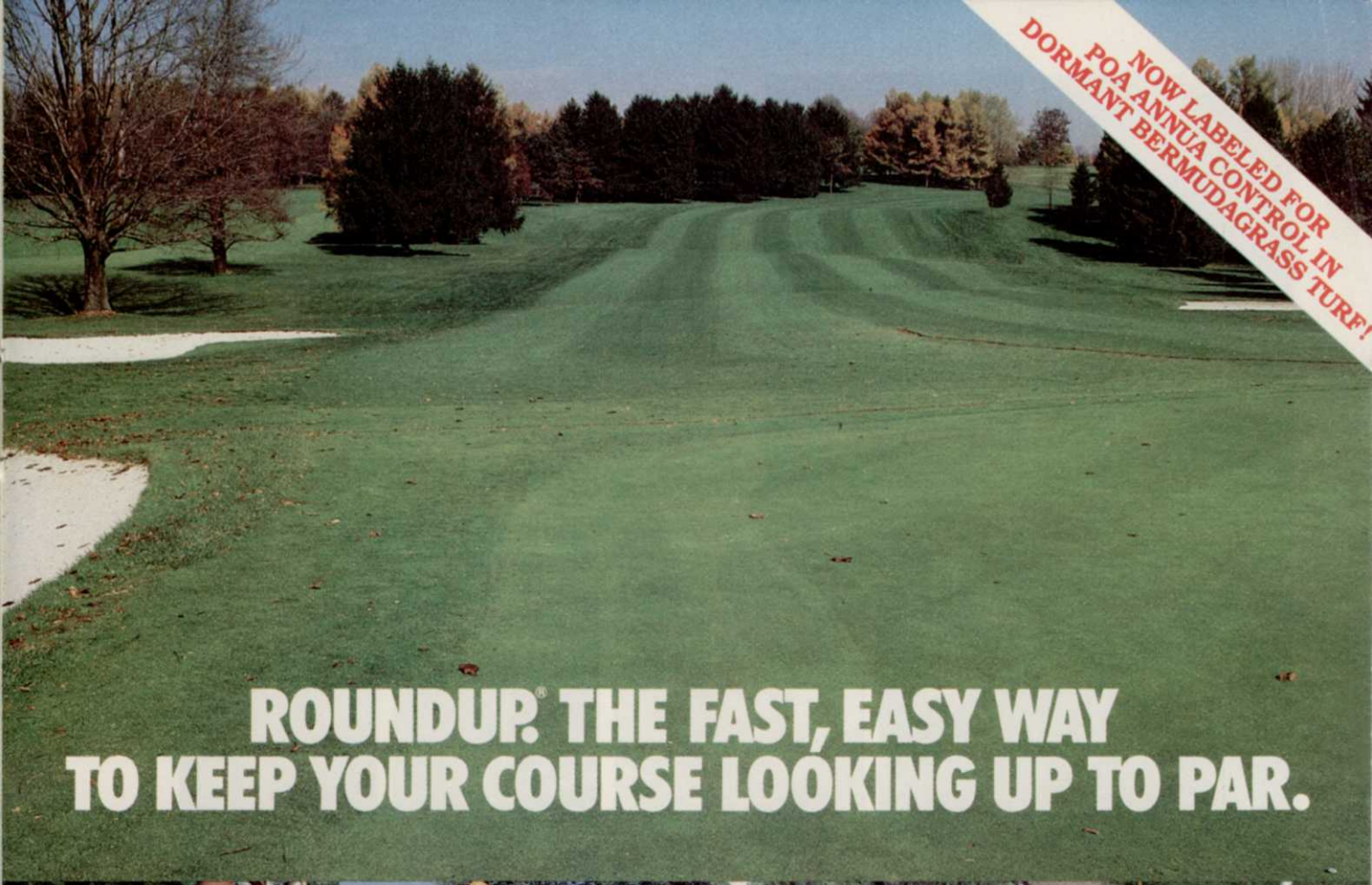
MID-SUMMER TO EARLY-FALL: Chewing insects that feed on foliage at this time of the year are often more unsightly than harmful to the plants. However, if the object is to keep foliage for the fall color change, one must be aware of these late season feeders. Life cycles of certain insects also dictates that control measures be employed at this time for optimum results and satisfied clients.

I. Scale Insects

1. Magnolia Scale — The crawler stage of this scale is active in the latter part of the growing season. Use Sevin, Diazinon, Malathion, Acephate on the crawler stage.
2. Pine Needle Scale — Second generations of this insect that can

Continued on page 56

Spider mite damage to one untreated juniper is evident by off-color foliage.



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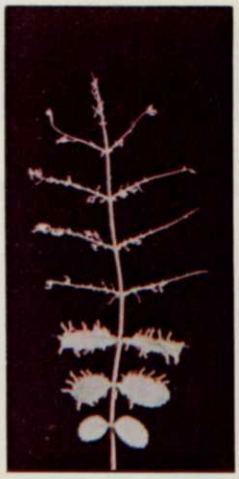
Circle No. 139 on Reader Inquiry Card

Tree Insect Identification Quiz

Quiz yourself. Answers are on the next page.

A. _____ B. _____

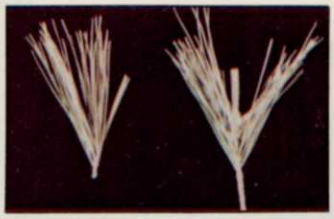
C. _____



D. _____ E. _____ F. _____

G. _____

H. _____ I. _____ J. _____



K. _____ L. _____ M. _____ N. _____

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Circle No. 219 on Reader Inquiry Card

blow in or be carried by other insects and birds or were missed early in the season, can explode and nullify all previous treatment. Use Sevin, Diazinon, Dymet, and Acephate on the crawler stage.

3. Fletcher Scale — Watch for crawler stage at this time of year on prone plants and use Sevin, Malathion, and Acephate.

II. Adelgids

1. Cooley Gall — This adelgid leaves the gall in late summer to start a new life cycle or may return from fir trees if the alternate host of this pest is in the area. Good coverage of the new growth with Diazinon, Sevin or Malathion is important.

2. Eastern Spruce Gall — Similar in nature to the cooley gall, but activity is later so timing is important for the particular area.

III. Leaf Feeders

1. Fall Web Worms — The second generation becomes very obvious at this time of year with extensive webbing of the foliage. Suppression can be obtained with Sevin or Methoxychlor.

2. Japanese Beetle — This colorful insect is destructive on many other plants. Weather conditions play an important role in these numbers. Control with Sevin or Methoxychlor will be dependant on local analysis.

3. Mimosa Webworm — Webbing similar to fall web worm where leaves are pulled together. Several generations, Sevin, Acephate, Diazinon

4. Oak Leaf Skeletonizer — Second Generation on Oak.

IV. Borers

1. Locust Borer — A problem on black locust — Emergency occurs in the fall and egg laying is when golden rod in bloom. Lindane as a trunk protectant where a problem exists.

2. Peach Tree Borer — Mid-late summer treatment may be necessary on valuable plants. Use Lindane or Lorsban.

ANSWERS TO TREE INSECTS

A. aphids
B. eastern tent caterpillar
C. euonymus scale
D. pin oak sawfly
E. mountain ash sawfly
F. dogwood borer (larvae)
G. mimosa webworm
H. willow leaf beetle
I. spruce mite webbing/damage
J. fall webworm
K. gypsy moth (larvae)
L. oystershell scale
M. pine tube moth damage
N. birch lead skeletonizer

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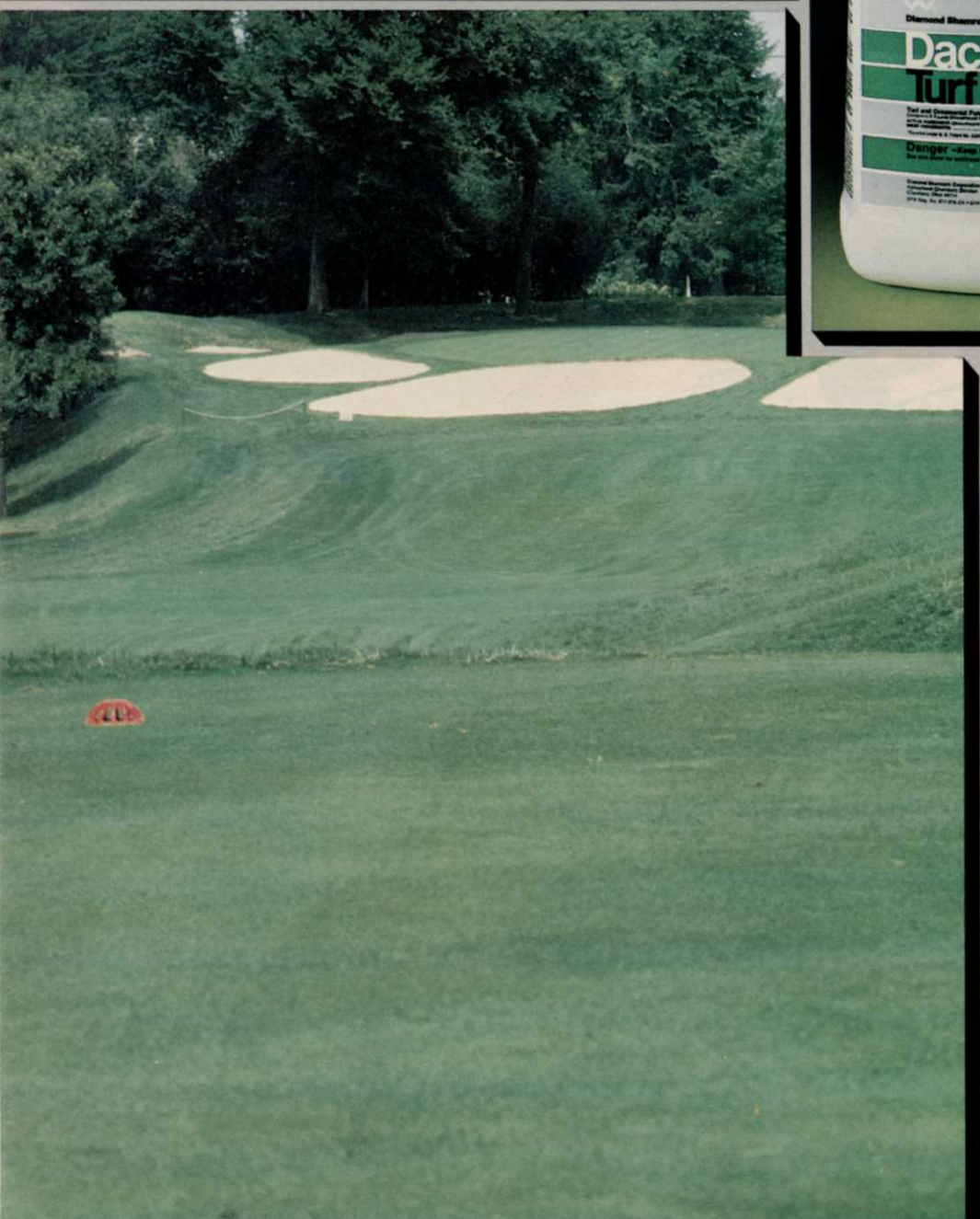

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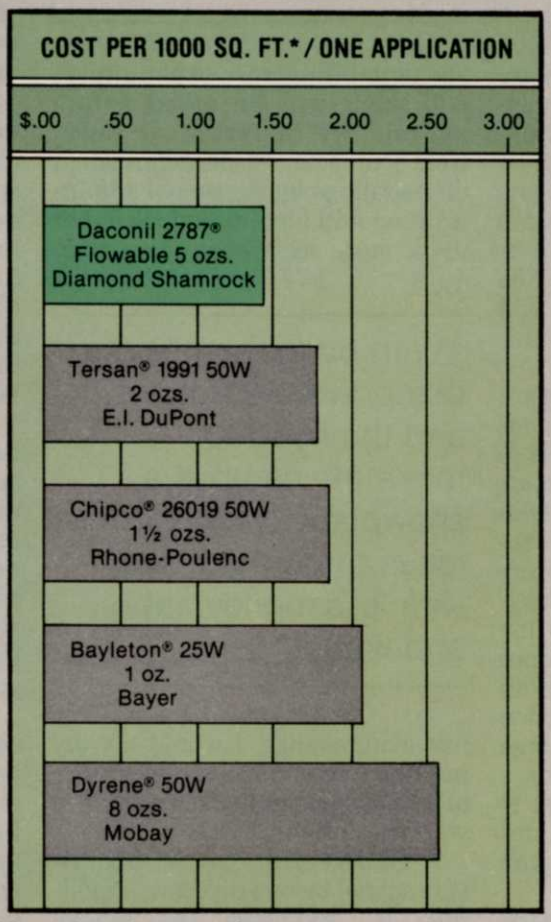

*Costs based on manufacturer suggested retail unit price as of January, 1983.

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Circle No. 112 on Reader Inquiry Card

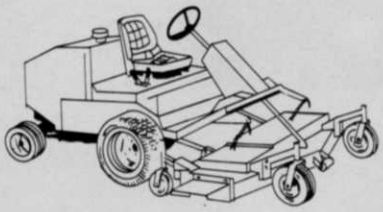
LANDSCAPE MANAGEMENT

Doing More With Less

School landscape managers seek ways to increase maintenance efficiency.

By Bruce F. Shank, Executive Editor

School Mowing Equipment.

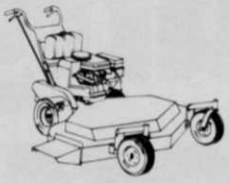


Riding Mowers

88% of schools have an average of 4

Trim Mowers

88% of schools have an average of 8.7



Mid-Size Walkers

23% of schools have an average of 3

Managers of school landscapes are facing a potentially severe mismatch between funding and property use according to the latest *Weeds Trees & Turf* survey. Nearly 70 percent of the school landscape managers reported their budgets have grown less than the inflation rate. Thirty percent said their budgets had not been increased at all.

"Doing more with less" was a common remark from survey respondents. "We have to be able to keep the campus and playing fields in usable condition with less help and more field use," said one respondent. A private college director of grounds said, "The most significant challenge in the next ten years will be to keep the campus maintained to high standards. With talk of budget cutbacks, reduction in manpower, and the college wanting to make the campus a showplace, it will be necessary to come up with new ideas and equipment to get more work with less money, labor, and water."

A public university landscape manager told *Weeds Trees & Turf* accountability for expenditures and labor will be asked before budgets are increased or saved from cutbacks. "Computerization of operations by the school administration will force us to look at our work more as preventative than just maintenance. I would say my position will and has become more of a manager and planner than a working position."

> "With budget cutbacks, manpower reductions, and the need to make the campus a showplace, we need new ideas to do more work with less money, labor, and water."

A management view of his private school by one director of facilities is, "Probably the biggest challenge to me has been to accomodate all of the various teams with playable fields. Next in line is water availability. Then women are becoming more interested in all sports. This is putting a drain on the available space. We are now in the process of proposing construction of two new fields, but this also adds to our water problem."

A public school general foreman has a bare bones attitude, "Due to the excessive damage done to school property, landscaping will have to become more basic, meaning a bare minimum of shrubs and beds. Flowering plants and bulbs are now extinct. Trees have to be larger when planted or they don't stand a chance. Seeding lawn areas is almost impossible to do anymore."

School landscape managers are more equipment oriented than chemical oriented. Some feel a responsibility to keep chemical usage down in public areas. As a result, they favor an equipment solution to efficiency. "Manufacturers and distributors can help me by producing things that can do more than one job," said a public school landscape manager.

General campus areas and athletic fields are the predominant responsibilities of school landscape managers. A third of the respondents also are responsible for gardens or an arboretum. Interior plants were described as a responsibility by 12 percent of the group. Less than five percent cared for golf courses.

A fourth of the respondents give some jobs to landscape contractors. While a large majority of the managers feel their crews can do a better job than the contractors, nearly half see the benefits of less equipment overhead and freeing up staff for other duties. Labor

Continued on page 62

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Circle No. 141 on Reader Inquiry Card

seems to be more of a concern than equipment cost to the schools.

Schools that use contractors spend an average of $4,700 for maintenance and $4,000 for planting. The average amount spent per year for landscape equipment purchase is $10,735. In addition, the schools spend an average of $4,136 to maintain equipment each year. The respondents spent an average of $5,900 for landscape chemicals in 1982.

The riding mower is king to the school landscape manager. Less than 25 percent use large, walk-behind mowers, proven to be more efficient than riders in 32- to 60-inch widths for many areas. Trim mowers abound with an average of more than 8 per school. If school managers follow efficiency tests by landscape contractors, they will replace many of the trim mowers and a few of the riding mowers with mid-size, walk-behind rotaries.

More than three-fourths of the schools have seeder/spreaders (2.7 each average). Sixty-five percent have spray units (1.6).

Aerifiers, proven to help compacted, heavily used areas, are owned by more than 60 percent of the schools. Less than a fifth of the schools own wood chippers.

Pickup trucks are the primary transportation of school landscape crews with an average of 2.5 per school. Larger trucks are owned by nearly 60 percent of the schools responding and 35 percent use smaller turf vehicles and trucksters.

Comparing this year's survey to the one *Weeds Trees & Turf* published in August 1982, contractors are not gaining school work. They have actually lost some of the school work, dropping from 33 percent to 23 percent.

Equipment expenditures have risen roughly 8 percent and chemical expenditures have gained nearly 20 percent. It does appear that landscape staff size has decreased markedly. This year's respondents average only five full-time landscape crew members compared to eight in our last survey.

There is a clear desire to reduce labor-intensive landscape tasks by reducing high maintenance plant material and designs and using more efficient equipment. School landscape managers are trying to get students and the public involved in their programs to gain their support. They are also trying to get a better handle on job costs to justify the budgets they have or to receive increases. There is the sense they are seeking, and could justify, solutions to efficiency in maintenance. Increasing use of athletic fields is taking a bigger chunk of their budgets. They will invest in methods to lower maintenance costs where possible. **WTT**

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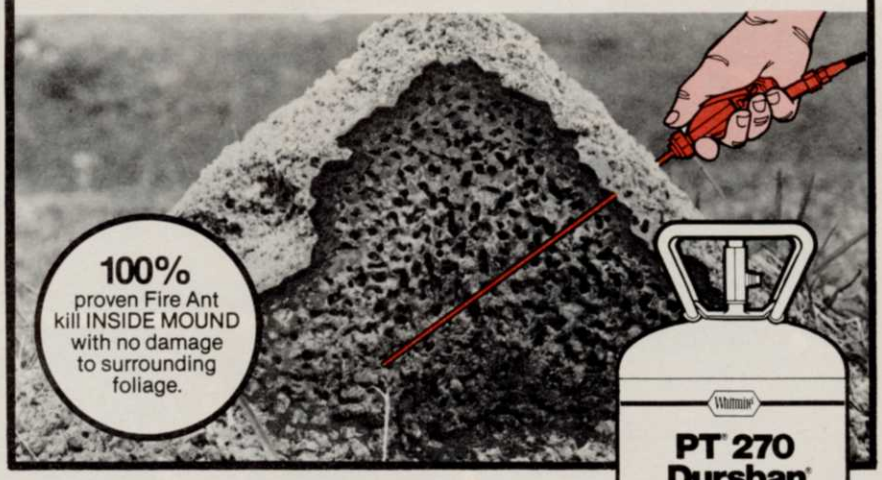

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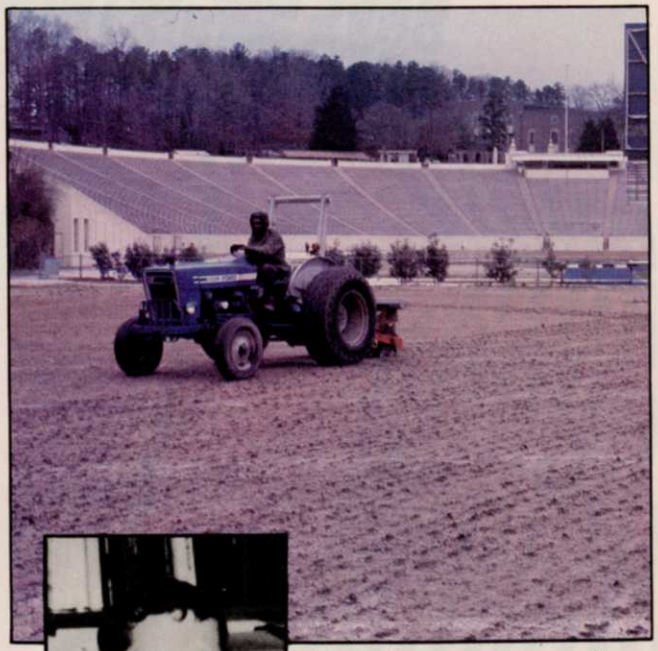
LANDSCAPE MANAGEMENT



David Love, *manager of operations at Duke University in Durham, NC. Recent jobs included a $400,000 renovation to the varsity soccer stadium and intra-mural fields.*

COUNTERACTING CUTBACKS

Duke's David Love uses computer and talking to students to take the bite out of across-the-board cutbacks

By Maureen Hrehocik
Associate Editor

Everyone today seems to be looking for ways to reduce operating costs while maintaining a high rate of services and quality. David Love, manager of operations at Duke University in Durham, NC, is no exception.

Constant interaction and communication with administration and students, a good working knowledge of his campus and a little help from an IBM personal computer are things helping to take the bite out of across-the-board cutbacks.

Love is using a computer to handle administrative problems, keep track of attendance and start a preventive maintenance program for his 900-acre facility which is divided into three main areas - the campus, medical center and golf course.

"We're also looking at possibly putting our work schedule on the computer as well," Love said.

Use of a computer really underscores the type of problems Love finds himself contending with.

"My problems are really more business-related now, than with turf," he admitted. "We're trying to change our operation from labor intensive to equipment-oriented.

One turf area Love does have problems with is shade. He said the campus, some parts of it built in the 1800s, has very few large, open grass areas. One of the reasons for this is Duke's School of Forestry Department. Because of it, large tracts of forest were left intact for research purposes.

"The inner campus is populated with large oak and white and Southern pines, he said. "We've had to go to alternate solutions for groundcover such as ivy, vinca or mulching with pine bark or pine straw. We're going toward a more natural look. Love also said this

continued on page 66

Duke University campus-*steeped in tradition*

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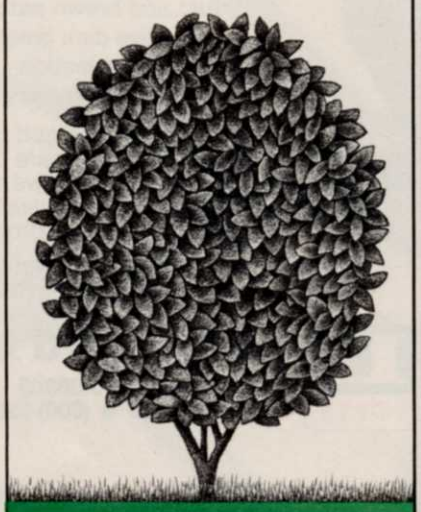

Circle No. 131 on Reader Inquiry Card

DUKE *from page 64*

move toward a more natural look cuts down on his mowing. He said he wants to reduce his 24 riding mowers by eight. To do this, he is also using more growth retardants such as Embark to cut down mowing areas.

Love uses eight Yazoo YR 60s and 12 Toro Groundsmaster 72s. He has four of the newer diesel models, which, he says, he's very happy with.

"Because of the students, we've found using a rear discharge mower is safer and it also cuts down on grass clippings getting on the sidewalks." Love uses a Turfpro 84 reel mower to mow the athletic fields.

"My problems are really more business-related than with turf . . ."

"We have been pretty much using Toro equipment because of its availability and it's easy to maintain," he said.

Love is responsible for 125 pieces of motorized equipment.

Of the 900-acre campus, 300 acres are in turfgrass and 57 acres are athletic fields. Love used to overseed all areas and used paraquat and Roundup on his bermudagrass fields.

"This year I didn't overseed the football fields or the practice fields. We used the irrigation system right up until December to keep the fields green. The soccer, baseball and intramural sports fields were overseeded with Legend ryegrass, which we've found to be a hardy-type rye. On other areas of the campus, we use a Baron mixture in the shade problem areas."

Love also has an 18-hole golf course to maintain which has its own $130,000 budget, not including major equipment purchases. Designed by Robert Trent Jones, Love says the course is hard to maintain on its current budget which includes five full-time staff members and six to eight students in the summer. There is currently almost year-round maintenance on the course which is open to the public. The master plan for the course calls for upgrading the irrigation system, building seven bridges over various stream locations, and changing some of the greens. (The course has bentgrass greens with bermudagrass fairways). Love said contributions from the alumni are funding a $1 million goal to accomplish the upgrading.

"The course is really in extremely good shape turf-wise," Love said. "We'll be adding some bunkers and deleting some."

Other major changes Love has completed on campus are a $400,000 renovation to the varsity soccer stadium and intra-mural fields. Outdoor lighting was installed and three more acres of bermudagrass turf were added to the playing fields. Love is also planning to replace the sand base of most of the campus' slate sidewalks with concrete bases to level the sidewalks. This job is expected to cost around $350,000.

"We work on a five-year capital plan. We alot $50,000 a year for equipment replacement. We're on a 10-year replacement schedule."

Love said the students as well as the administration take a more active involvement in the maintenance of the grounds than perhaps at most schools.

"We have lots of inspection tours here, with the administration taking an active role in how the campus develops.

"The students are very different here. They're very active in the administration of the campus. They're very boisterous in how they make their feelings known about how things are being done. There is a building and grounds committee, which is part of the student government, which I meet with once a month to discuss why we're doing things a certain way. We also have a faculty administrative oversight committee which even has input on what trees we cut down. We have a good working relationship, but these controls must be dealt with."

continued on page 68

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DUKE *from page 66*

While working with various administrative and student committees, Love is also responsible for administering a $1.6 million budget which is divided into 10 individual budgets. The campus is divided into six major areas - East, West, Central, Athletic, Central Housing and Medical (which is the largest.) Each has its own budget.

"We started off at 0-base budgeting and worked out budgets from there. The administration developed four different sets of standards for each area - trees, shrubs, turf maintenance and litter control. They then choose the amount of funding they would allot to each area.

Landscape work around new buildings (the university averages about one a year) is contracted out. Also the work done around the student housing area including erosion control and planting trees, is also contracted out.

"It's easier and more a matter of sheer volume," Love said.

Love 33, has been manager of operations at Duke for the past 2½ years. He holds a degree in horticulture from Michigan State and a business degree from the University of Toledo. Prior to coming to Duke, he was director of grounds and housekeeping for three years at Bowling Green State University in Ohio.

> Love said the students as well as the administration take a more active role in the maintenance of the grounds than perhaps at most schools.

With 9,000 students, 12,000 employees and 900 acres of campus to contend with, Love's strategy for success is simple.

"Coordination is why it functions as well as it does," he says simply. "We are trying to deliver quality and maintain it with an expanding campus and with slight growth in our budget." **WTT**

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LANDSCAPE MANAGEMENT

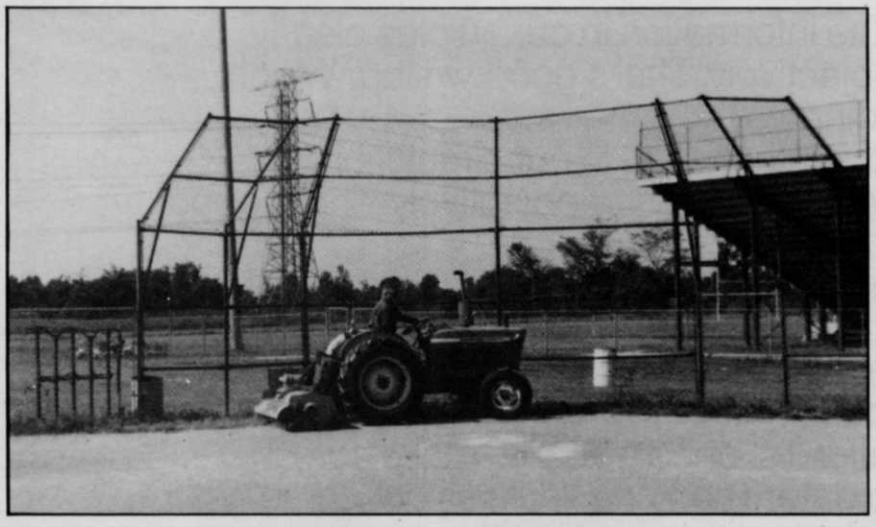
From Buses to Baselines

Grandmother goes from lunchroom aide to director of support services in seven years.

By MAUREEN HREHOCIK, Associate Editor

From housewife to director of transportation, grounds, maintenance and warehouses for the largest school district in Wayne County, Michigan, in seven years. For N. Faye Bird, that transformation has been an ongoing learning experience.

Bird is Director of Support Services for the Woodhaven School District in Woodhaven, MI, a 22-square-mile city/township south of Detroit. Like many others, shortage of staff, equipment and finances are the largest problems that confront the 52-year-old grandmother of three. She has been forced to cut down fertilizing and mowing and to forego name brand chemicals and fertilizers for less expensive types.



Work on *the district's athletic fields is one of the most time-consuming tasks.*

N. Faye Bird, *director of support services for the Woodhaven (MI) School District works on a $150,000 budget. Students help with work in the summer.*

"My philosophy thus far has been to keep things neat, clean and presentable," says Bird. "If we had the finances, we would like to have everything landscaped. We could have beautifully-manicured grounds."

Besides overseeing a 25-bus fleet with 18 regular drivers, custodians, grounds maintenance staff, warehouses, 11 school buildings and a host of other duties pertaining to running a school district, it is also Bird's responsibility to administer 500 acres in grounds and prepare football and soccer fields and tennis courts for play during the school season.

"We have an eight-day mowing calendar for most of our turf," she said, "however, we do maintain our baseball fields on a daily basis. We fertilize three times a year with a 12/12/12 mixture and use a 20/10/4 mixture for greenup purposes. I'm a tightwad, so we don't use one product brand all the time. When I find something that works and the price is right, I use it." The athletic field overseeding mixture used is 45 percent K-31 tall fescue, 20 percent perennial rye, 20 percent Kentucky bluegrass and 15 percent creeping red fescue.

The school district leases 150 acres to local farmers who plant mainly corn and soybeans. Bird's responsibilities include seeing that the acreage is kept tidy. Thirty of the 500 acres stand idle.

Bird's budget to accomplish all this is $150,000.

Of her 68-member staff, four are full-time grounds maintenance workers. The school district's one

Continued on page 72

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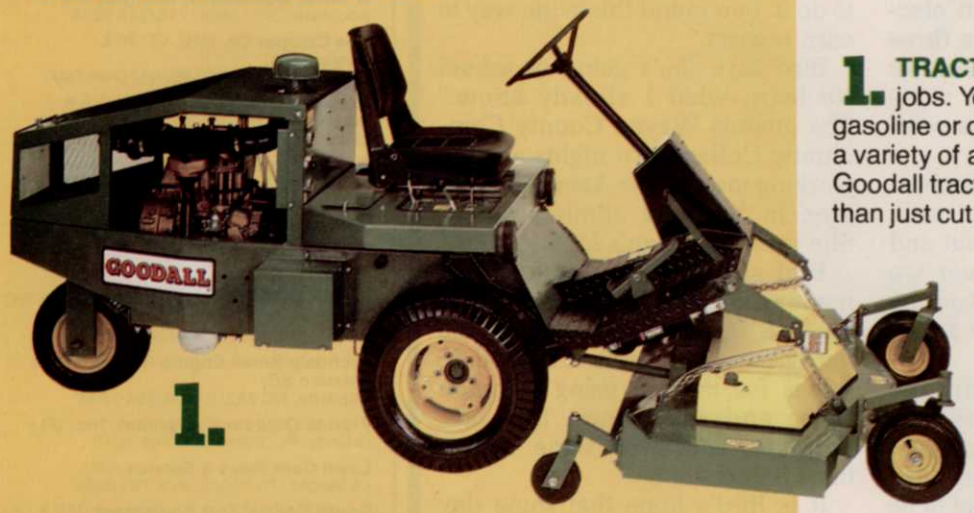

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GRANDMOTHER *from page 70*

football field is seeded, not sod. Baseball fields have been renovated.

Bird rents aerators, fertilizer spreaders, grasscatchers and electric rakes. The district owns three tractors, one pick up truck and two buses which have been overhauled to use as maintenance vehicles.

"I encourage districts to use buses for utility vehicles," Bird said. "We've taken all the seats out and can store and haul whatever we need to the location we're working on. You can't buy a truck for $1,200 these days."

Bird has lived in Woodhaven School District for 35 years. She admits it's been hard being a woman to gain acceptance in her position. In 1969, she volunteered to be a lunch aid and the following day became a school bus driver. In 1975 she was named transportation supervisor. In 1976, she was named director of support services.

"Most people out there don't believe a woman can do this job," she says. "I make mistakes like everyone else. I'm not a political person. If it's best for the district, I'm going to do it. I've found this is the way to earn respect."

Bird says she's going to school "to learn what I already know." She attends Wayne County Community College two nights a week working toward her Associates Degree in business administration. She is on the Dean's List.

Bird says her background as a homemaker and growing up on a 10-acre farm has given her the background to be able to fix and do things for herself, using common sense and experience. She has, however, conceded some operations to technology.

It is Bird's hope that some day her budget will match her future plans for Woodhaven, making it one of the most eye-pleasing and landscape-efficient districts in Michigan.

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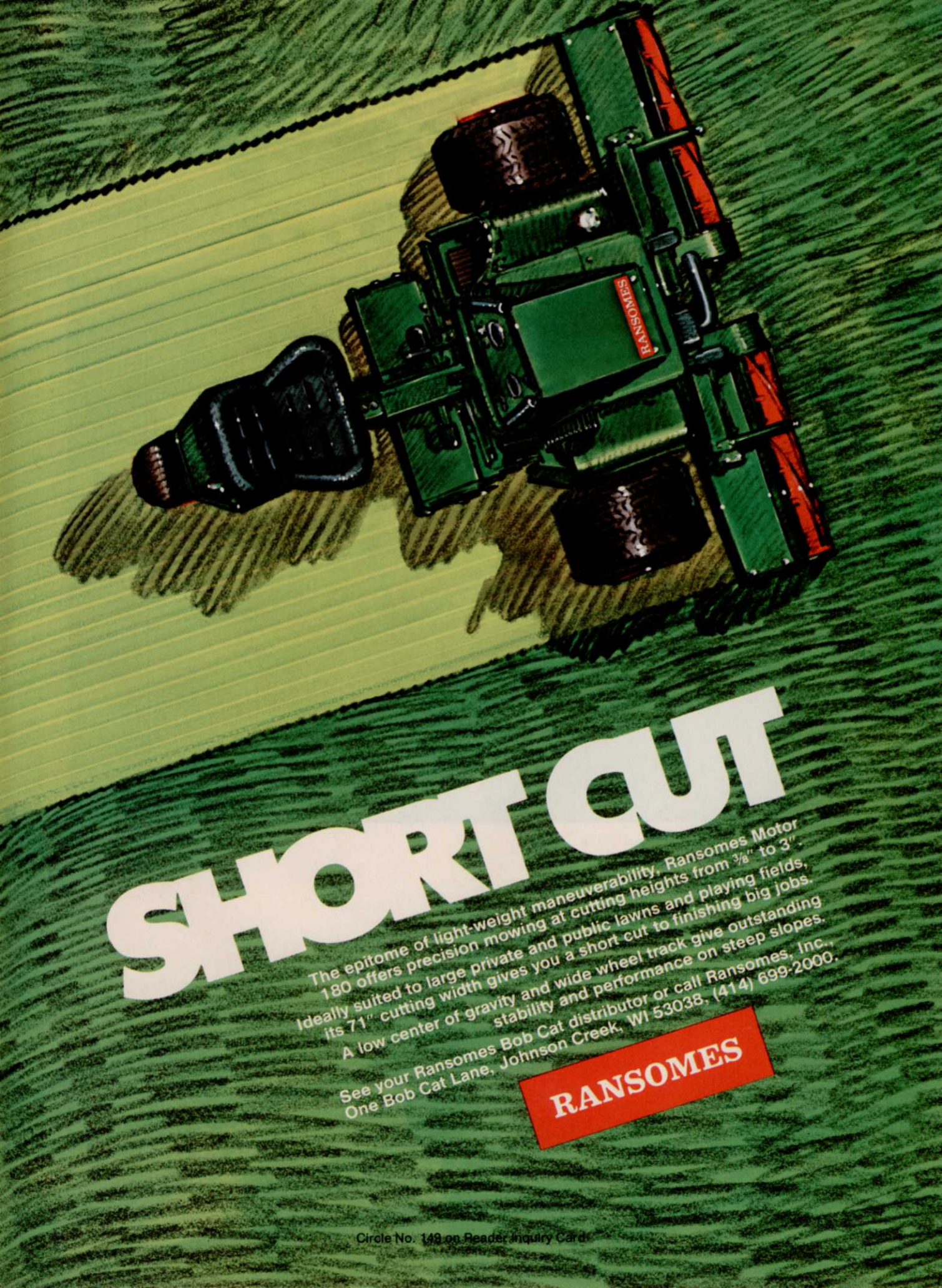
RANSOMES



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LANDSCAPE LOG

By Douglas Chapman, horticulturist, Dow Gardens, Midland, Michigan

JUNE JOB FOCUS
1. **Insect Control**
2. **Disease Control**
3. **Trimming**

June makes a transition in the landscape from the panic of spring construction and maintenance to a growing season with predictable problems and more preventative maintenance. Insect concerns of June include scales, June beetles, and borers. The abundant supply of spring moisture is rapidly changing to a landscape that needs irrigation, our rhododendrons should be protected against Phytophthora, and early shrub pruning, or shearing, can commence.

INSECTS

June is a month where many scale insects can be controlled in the crawler stage. This crawler stage is the most vulnerable and easy-to-control period during the life cycle of scale. One should first be on the outlook for heavy infestations. If they are apparent, then control means should be considered. Several symptoms of heavy scale infestation, include honeydew dropping on the ground under the tree with the resulting sooty mold build up and stunted new growth. The scale insects that often warrant control (if of significant populations), during early to mid June, include San Jose Scale, Euonymus Scale, European Elm Scale, and Putnam Scale. During mid to late June the crawlers are active for Lecanium Scale, Cottony Maple Scale, Golden Oak Scale, and Pine Tortoise Scale. These sucking insects can easily be controlled with old insecticides, e.g. Malathion or Diazinon, or many of the newer insecticides appearing on the market today, e.g. Ficam or Orthene. Your state Cooperative Extension Service should be the source for currently approved and recommended pesticides.

With drier weather and higher temperatures, mites, e.g. Honey Locust Mite, Two-spotted Mite, and Spruce Mite, can become a serious problem quickly. These sucking insect-like animals suck juices from the foliage on spruce, junipers, other evergreens, and a wide range of deciduous trees. The plants quickly take on a reddish-brown color. The best pesticides to use on mites include either ovicides, that is a miticide that controls both eggs and adults, or relatively longlived miticides, such as Plictran.

Borers can most effectively be controlled during the month of June. Although many borers attack only weakened or recently transplanted trees, one should be on the alert for these insects. Four devastating borers which should be looked for and controlled, if necessary, include Flat-headed Apple Tree Borer, Bronze Birch Borer, Dogwood Borer, and Maple Petiole Borer. Although there are several materials that can be used, one particularly effective and generally recommended pesticide is Dursban. Two unique, yet devastating, insects that can best be controlled in early June, causing damage in significant ways, include June Beetle adults and Black Vine Weevil. June Beetle is capable of defoliating deciduous trees. One should be on the alert to the build up of this significant problem and spray as population and damage warrant. Black Vine Weevil is particularly devastating on yews, a backbone shrub of many midwest and northeast landscapes. With the new pesticides, Orthene and Ficam, control of this insect during early June is quite possible. Control is particularly important as the adults feed on the foliage while the immature larvae destroy the root system. Symptoms are plants with poor vigor and little or no growth (also symptoms of high water tables).

DISEASES

Phytophthora cinnamomi on rhododendron starts appearing as a significant problem in June with the higher temperatures. It is particularly devastating on the Caroliniana Rhododendron types and many of the deciduous azaleas. This problem has been noted with plants grown south of New Jersey for many years, but with increased use of rhododendrons and current production practices, this disease is appearing on particularly susceptible cultivars in nurseries as far north as Boston or northern Ohio. Control is particularly easy with the new CIBA Geigy compound, Ridomil (Subdue). This fungicide, applied as a soil drench, should control this particularly troublesome problem.

Hawthorn has had problems with fireblight and rust. By the use of Lavalle Hawthorn (x *Crataegus lavallei*) or Washington Hawthorn (*C. phaenopryum*), one can reduce the need for spraying. These types of hawthorns are well suited to the urban landscape, street or park tree, commercial landscape, and the home grounds.

TRIMMING

Evergreen trimming, or pruning, should commence in early spring during June and extend during July. Not only is this a time that junipers and yews are most easily pruned, but it is a period when the landscape log, or maintenance schedule, is lightening up. Further, shaping, dwarfing, or increasing the density of pines could be most readily accomplished during June as the candle growth is ½ to ⅔ extended. You can remove 40-60% of this new candle growth by shearing, with the end result—compact, dense new growth.

As June dries out, irrigation is of greater concern. The increased irrigation and regular mowing certainly takes center stage, with other time spent in observing the landscape and controlling the problems as they appear. **WTT**

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PROBLEM SOLVERS

By Balakrishna Rao, Ph.D., and Thomas P. Mog, Ph.D.

Q: *How much grade change can a tree withstand? Does this include mulches? (Pennsylvania)*
A: Grading or other activities that cover tree roots can cause root mortality. The root system of trees is more extensive than many people realize. The roots of an open-grown shade tree can easily fill a circle as wide as the tree is tall. This fact is often overlooked when constructing buildings and parking lots, laying drain tiles or burying lines for utility services. These activities disrupt the soil profile. Topsoil is removed or buried; subsoil from the B-horizons is brought to the surface, pushed and piled on top of tree roots.

There are no steadfast rules, only guidelines, as to how much fill or grade change a tree can tolerate.

Six inches of heavy, poorly drained subsoil covering the roots can kill an established tree.

One inch of fill kills some roots, but not necessarily the tree.

It is true that mulches cover *part* of the root system but no one would use subsoil as a mulch. Assuming that an acceptable material is used, mulching to a depth of one to six inches should not harm the tree. The thickness will depend upon factors such as the size of the tree, the health of the tree and the nature of the mulch. The best advice regarding grade change is—don't do it. If you must change the grade around trees, seek professional advice from an arborist or landscaper *before*, not after, the grade change is made.

Q: *What is the latest information on the gypsy moth situation and what can we expect in 1983? (Maryland)*
A: Gypsy moth is present in 32 states. According to the Federal Animal and Plant Health Inspection Service, total defoliation in 1982 was 8.1 million acres, down from 13 million acres in 1981. Populations are collapsing in parts of the Northeast. The decline may be related to a buildup of nucleopolyhedrosis virus in forested areas and the low temperatures last winter. The Carolinas and Virginias are the areas of greatest new activity. Trap catches and egg mass counts show gypsy moth is in the outbreak phase in some parts of Maryland.

In tests last year, *Bacillus thuringiensis* (Bt), used at 12-16 Billion International Units (BIU) per acre, gave foliage protection equal to chemicals (Sevin) and the cost was competitive. More states will use or are considering switching to Bt because it is acceptable to environmentally concerned citizens.

Predicting what will happen in 1983 is as difficult and hazardous as predicting the weather. On the National level, a decrease is expected in the overall infestation. Ohio, Pennsylvania, West Virginia, Virginia and North Carolina are expected to see an increase in gypsy moth numbers and activity. There are localized "hot spots" in other states. In particular, Indiana, Ohio, Michigan, Oregon, Washington (state) and California were mentioned during the National Gypsy Moth Review held in December 1982. Detailed information for a particular locality, i.e., city or town, is best obtained from specialists working within the area, usually the state department of agriculture.

Q: *Because of difficulty in obtaining commercial mixes, I have been mixing my own soil mixes which consist of composted barnyard soil. This works well at first, then produces an algae-like, scummy film on bare spots where no seed has germinated. Do you think I should increase my sand con-*

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tent (now at 65%) and let me know where I could send samples of the soil and mix for analysis? I have had only the standard pH (6.5) and nutrient tests done so far. Also, irrigation is from an algae-ridden lake too big to treat. (Minnesota)

A: I do not believe that increasing sand content from 65% would help minimize the algal problem, although using coarse instead of fine sand would be beneficial. Several factors such as poor drainage, compacted soil and low pH can either individually or cumulatively contribute to algal problems. Algae is most often associated with wet soils and is most common in situations where the turf is already weak or not in an active state of growth. Reports also suggest that, in contrast to moss, algae is often associated with high nitrogen and phosphorus fertility. Generally, algae associated with turf are not parasitic. However, when the algae dry up, a rather impervious black crust is formed which will prevent water and pesticide movement into the soil. The crusts developing on the shoots of the turf can absorb heat and impair growth.

Check and adjust the pH (6.5) of the inherent soil. Most state universities have soil testing laboratories. In addition, there are a number of private soil lesting labs in the United States. For additional information, contact your local extension service department.

Improve surface drainage. If the soil is compacted, coring or aerification practices should help minimize the problem by improving water infiltration and aeration. Determine the reasons for poor germination in some areas. Perhaps the algal crust may be preventing the germination. These bare spots make an ideal location for algal growth under favorable conditions. Also, recognize the fact that you are using algae-contaminated water for irrigation which probably is the main source for algal buildup. If possible, control the algae and then use the water for irrigation.

Raise the mowing height to increase the vigor of the turf to compete with the algae. Improve air circulation, if that is a contributing factor, by pruning tree branches. If desired, apply copper sulphate as a dilute solution at 2-3 oz. in 4 gallons of water per 1000 square feet. After the algae die, the application of 2-3 lbs. per 1000 square feet of hydrated lime will act as a desiccant and help adjust the pH, discouraging algal growth. Often fungicides like Mancozeb or Thiram, used for disease prevention, also provide adequate algal control.

You may have to overseed large bare spots and maintain good cultural practices to avoid future algal problems.

Balakrishna Rao is plant pathologist and Thomas Mog is pest management specialist for Davey Tree Expert Co., Kent OH.
Questions should be mailed to Problem Solvers, Weeds Trees & Turf, 7500 Old Oak Blvd., Cleveland, Ohio 44130. Please allow 2-3 months for an answer to appear in the magazine.

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26	27	28	29	30		

Western Chapter of the International Society of Arboriculture 50th Annual Meeting, Anaheim, CA. May 10-14. Contact Mel Sease, Western Chapter, ISA, PO Box 7308, Riverside, CA 92513, (714) 780-8464.

Southern California Turfgrass Council and University of California Cooperative Extension Turf and Landscape Institute, Anaheim, CA. May 23-25. Contact SCTC, 1000 Concha St., Altadena, CA 91001.

Turf Landscape Meeting, University of California, Riverside, Anaheim, CA. May 24-25.

Annual Convention, Kentucky Cemetery Association, Louisville, KY. June 9-11. Contact Lewis C. Tingley, Resthaven Memorial Park, P.O. Box 18068 Louisville, KY 40218, (502) 491-5950.

California Association of Nurserymen Nursery Field Day, Research Reports, University of California, Riverside Campus, **July 7.** Contact CAN, 1419 21st St., Sacramento, CA 95814, (916) 448-2881.

Aquatic Plant Management Society, Inc. Annual Meeting, Duch Inn, Lake Buena Vista, FL. **July 10-13.** Contact APMS, PO Box 16, Vicksburg, MI 39180.

American Sod Producers Association Summer Convention and Field Days, Atlantic City, NJ. **July 11-13.** Contact Bob Garey, Executive Director, 9th and Minnesota, Hastings, NE 68901. (402) 463-4683

American Association of Nurserymen Annual Convention, Montreal, Canada, July 16-20. Contact AAN, 230 Southern Bldg, 15th and 8th Sts. NW, Washington, D.C. 20005 (202) 737-4060.

Mississippi Turfgrass Association 24th Annual Conference, July 24-26. Contact Jim Perry, Dept. of Horticulture, Mississippi State University, (601) 325-3935.

University of Illinois Turfgrass and Ornamentals Research Field Day, Ornamental Horticultural Research Center, Urbana, IL, **July 27.** Contact Dr. Dave Wehner, 1707 S. Orchard, Urbana, IL 61801. (217) 333-7848.

Central Plains Turfgrass Foundation-Kansas State University Field Day, Manhattan, KS. **July 27.**

To insure that your event is included, please forward it, 90 days in advance, to: WEEDS TREES & TURF Events, 7500 Old Oak Boulevard, Cleveland, OH 44130.

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THE JET SET IS "IN" —
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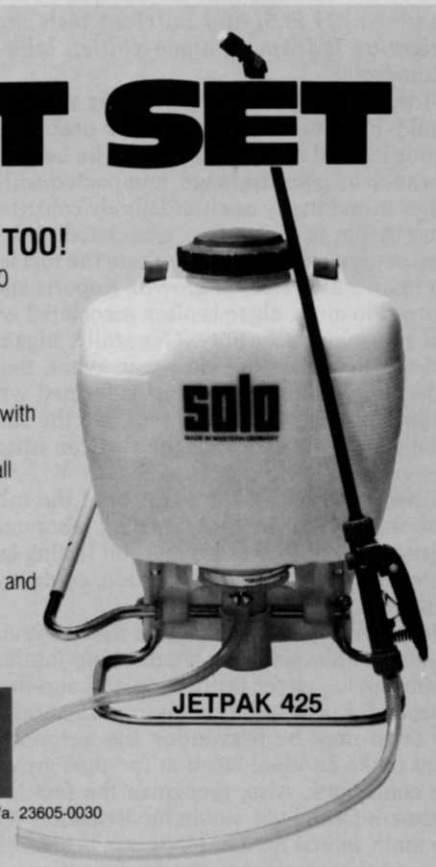

JETPAK 425

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Circle No. 152 on Reader Inquiry Card

NORTHRUP KING PRESENTS

THE HEAVY TRAFFIC, CLEAN MOWING, SALT TOLERANT, DISEASE FIGHTING, SUN-TO-SHADE GRASS SEED.

No one grass seed combines every characteristic for every type of turf. That's why Northrup King research has developed a complete line of Medalist Turf Products to meet specialized professional needs.

MEDALIST TURF PRODUCT	MAJOR AREAS OF USE	SPECIAL FEATURES
Athletic Pro Mix	High maintenance athletic turf	Both are well suited for new seeding or overseeding. Fast establishing, excellent traffic tolerance, and rapid recovery. Provides good footing.
Athletic Pro II Mix	Low to moderate maintenance athletic turf.	
Boulevard Mix	Any area with high pH (roadsides, sidewalks, boulevards, beachfronts, etc.)	Contains both "Fults" *Puccinellia distans* and Dawson red fescue which thrive on high saline or alkaline soils. Performs at low to high fertility levels.
Landscape Pro Mix	School grounds, cemeteries, golf course roughs, lawns	Fast establishing. Adapts to broad range of conditions and management levels. Low to moderate fertility requirements.
Overseeder II Mix	Fairways, tees, athletic fields	Fast establishing, traffic tolerant, disease resistant, penetrates compacted soil.
Medalist North Mix	Fairways, tees, cart paths, wear areas	Long term quality in high traffic areas. Clean mowing and disease tolerant.
Premium Sod Blend	Commercial sod producers	Fast establishing, exceptional dark green color, shade tolerant, superior disease resistance.
Special Park Mix	Parks, commercial developments, lawns	Low fertility tolerance, shade tolerant, adapts to wide range of soil types.

Ask your Northrup King distributor about the Medalist Turf Products for your needs. Or write Northrup King Medalist Turf Products, P.O. Box 959, Minneapolis, MN 55440.

MEDALIST TURF PRODUCTS

Circle No. 142 on Reader Inquiry Card

OMC introduces new Grass Caddy

Cushman Omc Lincoln has introduced a new Grass Caddy grass catcher for its out-front mower, Front Line.

The Grass Caddy features a 16-bushel hopper and chute made of durable cross-linked polyolefin. It

mounts to the side of the special-design 60-inch deck and tractor opposite the trimming side of the deck so it doesn't interfere with up-close trimming. The Grass Caddy also features a window in the hopper door, so the operator can view it filling.

The dumping system is hydraulically operated from the driver's seat, and there is no separate blower to maintain. The operator can dump clippings into a container or pick-up bed with 4½-foot sides. The chute folds over the mower deck for ease of cleaning.

The Cushman Front Line is available with a choice of power plants: 18 hp OMC gas engine or a 17 hp diesel. Optional accessories include snowthrower, rotary brush, ROPS, cab and rear discharge deck in addition to the new Grass Caddy.

Circle No. 170 on Reader Inquiry Card

Super Wet increases water penetration

W.A. Cleary Chemical Corporation has begun marketing a new Super Wet wetting agent, a product to help the professional turf manager increase water penetration in heavily thatched and compacted soil areas, resulting in lower water requirements and more effective pesticide and fertilizer applications. Test results show that this solution more than doubles water penetration, surpassing nearly every other wetting agent on the market. Super Wet is a non-phytotoxic when used as directed and prevents dew formation on treated areas.

Circle No. 171 on Reader Inquiry Card

Brouwer sod cutter features "split blade"

Brouwer Turf Equipment's newest addition to its product line, the sod cutter, Model 10, features a 13 inch cutting

width and ½ inch to 1½ inch depth of cut. New "split-blade" cutting concept reduces vibration and increases traction and cutting efficiency. The machine is lightweight, weighing only 195 pounds and requires only a 5 hp en-

Continued on page 86

In your efforts to grow grass, do you find yourself grasping at straws?

Hydro Mulch® Fibers offer a more efficient seeding method than straw.

And there are several good reasons why. Straw mulching is no longer such a "low cost" seeding system. Not in most of today's projects. Too much time is spent in multiple application steps. And straw is difficult to apply. Even in a moderate breeze, it can blow away, during application, and after application—before any tackifier is laid down. As a result, straw spreads unevenly, leaving areas unprotected.

Hydraulic mulching with Hydro Mulch® fibers is an alternative that keeps your total installed costs down. A one step turf establishment process that works. On every type of terrain. And the seeded area will sprout

the kind of good results you demand from a mulch.

For complete information on hydraulic mulching with Hydro Mulch® fibers, contact Conwed Corporation, Fibers Division, P.O. Box 43237, St. Paul, MN 55164-0237, or phone (612) 221-1190.

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innovative products for better environments

Hydro Mulch® fibers. A one step turf establishment method that works on every type of terrain.

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HBJ PUBLICATIONS does a better job of reaching those who count *(your potential customers)* than any other business publisher.

Magazine	Circulation
Beverage Industry	22,000
Body Fashions/Intimate Apparel	10,162
Candy & Snack Industry	3,500
Dairy Field	18,134
Dental Laboratory Review	17,297
Dental Management	100,005
Drug & Cosmetic Industry	9,929
Flooring	22,241
Food & Drug Packaging	54,853
Food Management	50,077
Hearing Instruments	17,095
Home & Auto	22,228
Hotel & Motel Management	36,061
Housewares	12,863

Magazine	Circulation
Industrial Education	46,594
LP/Gas	14,684
Lawn Care Industry	12,310
Neurology	13,069
Paperboard Packaging	12,111
Paper Sales	12,592
Pest Control	14,684
Professional Remodeling	36,627
Quick Frozen Foods	20,785
Rent All	11,139
Roofing/Siding/Insulation	18,310
Snack Food	9,138
Toys Hobbies & Crafts	13,982
Weeds Trees & Turf	43,041

Don't forget that classified advertising works just as effectively in locating employees as it does if you are looking for a position, have a line, machinery or a business to sell, are seeking representatives or wish to buy a specific item. Let it go to work for you!

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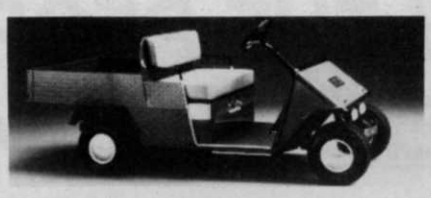
gine for less fuel consumption and reduced operating costs. The machine has folding handles and kick stand for easy and stable transporting and storage. Model 10 is ideal for landscapers, golf courses, parks, cemeteries, utilities and rental outlets.

Circle No. 172 on Reader Inquiry Card

Light turf vehicle fills golf car gap

E-Z-Go's Light Turf Vehicle, GX-800, is engineered to serve as a utility run-



about when a truck is too large. "Because of its weight distribution and special trend design, the GX-800 can be driven right onto the grass, without worries about harming a painstakingly-maintained surface," reports Ron Patterson, E-Z-Go president. With a payload of 800 pounds, the car literally hauls its own weight, and has rear bed capacity of almost ten cubic feet.

Circle No. 173 on Reader Inquiry Card

New Cozy Cabs for Deere 420 and 318s

Cozy Cab comfort and protection is available now in all-new, sturdy steel designs for John Deere 420 and 318 garden tractors. Cabs are painted to match John Deere green. One-piece safety glass windshield gives a clear view all around and swings open for easy access to the engine. The rear

window also swings out and is removable, just like the two side doors. Floor mat and vinyl-padded roof add to sound-conditioned comfort for operator. Seat belt is included. Options include yellow flashers, defroster fan and wiper. Rops-tested Cozy Cabs meet OSHA standards for 20 hp tractors. Cozy Cabs will continue to offer its present cabs for 200,300, 400 John Deere tractors.

Circle No. 174 on Reader Inquiry Card

Handy pocket guide to cure turf ills

"Picture Clues To Turfgrass Problems" is a laminated, pocket-sized publication containing color photographs on thirty-seven pages of turfgrass insects, diseases and cultural problems with explanations for diagnosing them.

Funds from members of the Long Island Turfgrass Advisory Industry were used to urge Cornell Cooperative Extension of Nassau County to revise a similar publication from the 1960's.

The guide, which is recommended for sales personnel and landscape crews, sells for $5 plus postage and can

Continued on page 88

Lebanon

Wherever you go, Lawn Care Products keep you and your customer in the green!

Country Club® GREENSKEEPER GREEN GOLD

Complete: Time Tested - Time Proven...

There is a *"LEBANON"* Professional Turf Care Product for all your turf care needs. *"COUNTRY CLUB", "GREENSKEEPER"* and *"GREEN GOLD"* are names you can trust to help grow stronger, more vigorous turf—*Consistantly & Economically!*

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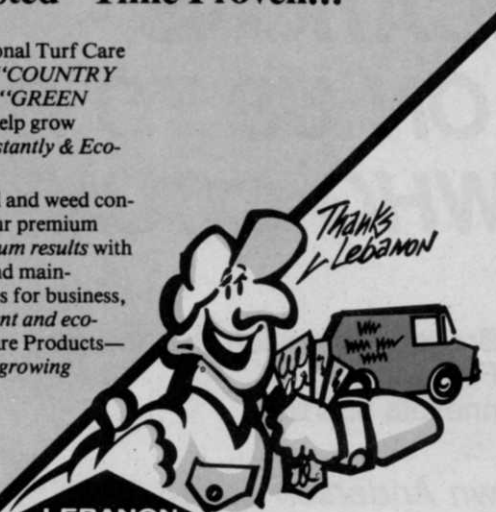

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LEBANON

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Lebanon, Pa. 17042

Circle No. 162 on Reader Inquiry Card

COUNT THE YEARS OF DAVEY TREE EXPERIENCE.

Davey Tree is the world's original tree care specialist. We've been "keeping America green for 73 years."

Davey Tree is also the world's largest tree care specialist. Mainly because we've built a reputation for top quality work at reasonable costs.

This means we can offer you a full range of services for commercial and municipal properties.

Pruning, feeding, insect control, and tree surgery done by highly trained people using specialized equipment.

What's more, other tree companies can't match many of these services:

Our arborists are trained at the Davey Institute of Tree Sciences in Kent, Ohio.

A staff of entomologists, agronomists, and plant pathologists at no additional charge.

Patented ARBOR-GREEN® tree fertilizer with a two-year formula, available only from Davey.

And comprehensive insurance that fully protects our employees as well as public property.

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Another nice thing. Davey will work with you to help develop budgets, surveys, and specifications for your new or on-going tree care program.

For a free consultation, look us up in the Yellow Pages under "Tree Service." Or write to: Donald J. Shope, VP Tree Care Services, Davey Tree, 117 S. Water St., Kent, Ohio 44240.

Davey Tree. Our 73 years of experience is the one thing you can count on for all your tree care needs.

DAVEY TREE

Kent, Ohio • Coast to Coast and Canada

Keeping America Green Since 1909.

Circle No. 109 on Reader Inquiry Card

be purchased from Cooperative Extension of Nassau County, 1425 Old Country Road, Building J, Plainview, New York 11803.

Circle No. 175 on Reader Inquiry Card

Herbicide controls broadleaf weeds

According to Rhone-Poulenc Agrochemical Div. marketing manager Lionel Wells, Buctril® herbicide controls a wide variety of broadleaf weeds on established turf including bentgrasses, Kentucky bluegrass, fescues, ryegrass, Bermudagrass and St. Augustinegrass. "Buctril herbicide is a contact weed killer that controls weeds more quickly than most other available selective turf herbicides, and is very effective against prostrate spurge, a hard-to-control turf weed," says Wells.

Circle No. 176 on Reader Inquiry Card

Parsons has steerable walk along trencher

Parsons Company of Milwaukee, WI, is offering the T-19, a new steerable walk-behind-type trencher for the rental and light construction market. Features include 18 hp Wisconsin TJD engine, full circle front caster wheel for exceptional maneuverability, hydraulic traction drive, hydraulic boom lift. Options include backfill blade, boring unit and crumber attachment. A 35-inch width for backyard gates is a special feature.

Circle No. 177 on Reader Inquiry Card

Rubigan controls 5 turf diseases

Rubigan fungicide from Elanco controls dollar spot, snow mold, stripe smut, Fusarium blight and large brown patch. Turf diseases are cured even after significant injury to existing fields and grass also recovers more quickly. Rubigan penetrates quickly into leaf tissue and moves upward with the transpirational stream. While the spray is drying, the active ingredient moves inside the plant where it cannot be washed off.

Circle No. 178 on Reader Inquiry Card

Accu-Gage judges height of cut

Accu-Gage from Precision Tool Products Co., Clinton, MI, is a precision measuring instrument for making highly accurate height-of-cut adjust-

Continued on page 90

Daconil 2787® Green Tag Sweepstakes

Better order now to better your chances of winning.

The Daconil 2787 Green Tag Sweepstakes begins January 1 and ends May 31, 1983. During this time, there will be a green tag on every case of Daconil 2787 fungicide. It's your entry blank for the Green Tag Sweepstakes.

So the more cases you purchase, the more entries you can send in. And the better your chances of winning valuable prizes for your company or club.

Grand Prize – A Motorola Maxair Base Station FM, 2-way Mobile Radio

10 First Prizes – Set of Cobra, 6-channel Walkie-Talkies

100 Second Prizes – Taylor Weather Station

For more information, contact your Diamond Shamrock chemical dealer.

Diamond Shamrock

Agricultural Chemicals Division
Diamond Shamrock Corporation
1100 Superior Avenue
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Circle No. 111 on Reader Inquiry Card

Change spray tips clean strainers in seconds... *without tools!*

New QuickJet system

New QuickJet System minimizes your service time and helps assure accurate delivery. The self-aligning quick "on/off" cap can be used with all interchangeable spray tips. The caps are available in 8 colors for color-coding different tip sizes.

QUICKJETS SAVE TIME AND MONEY.

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Now, get the Kalo Backpack Sprayer for only $119.95!

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Light yet tough

The Kalo Backpack Sprayer weighs only 8.8 lbs. because it's constructed of molded UV stabilitized polypropylene, specially selected for its lightness of weight, rugged durability, and chemical resistance.

Portable yet versatile

Anywhere you can walk you can take the Kalo Backpack Sprayer. Contoured back and fully adjustable shoulder straps assure maximum comfort and fit, even during long periods of use. Tank holds up to 5 gal. of liquid. Three separate nozzles are included as standard equipment—the hollow cone nozzle for insecticides and fungicides, the flood jet nozzle for liquid fertilizer, and the fan spray nozzle for weed killers and general spraying applications.

Easy to use

Just fill, pump, and spray. Wide neck and basket strainer make filling easy. Clean-up is quick—takes only minutes. Lever-action diaphragm pump can be altered for either left or right hand operation, incorporates a relief valve and working pressure adjustment to give you pressures of 15 to 45 p.s.i. with uniform output and maximum flowrate of more than 1 gal. per minute. The spray lance is fitted with a trigger valve for precise application and has a removable filter for fast clean-up.

Money back guarantee

Test the Kalo Backpack Sprayer with plain water. If not completely satisfied, return within 10 days and the full price of your purchase will be refunded.

Order now

Send your check or money order for $119.95 direct to Kalo at the address below. Your order will be rushed to you by U.P.S. Visa or MasterCard holders, use our toll free number for fast action. (Kansas residents add 3% sales tax, Illinois residents, 5%.)

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Agricultural Chemicals, Inc.
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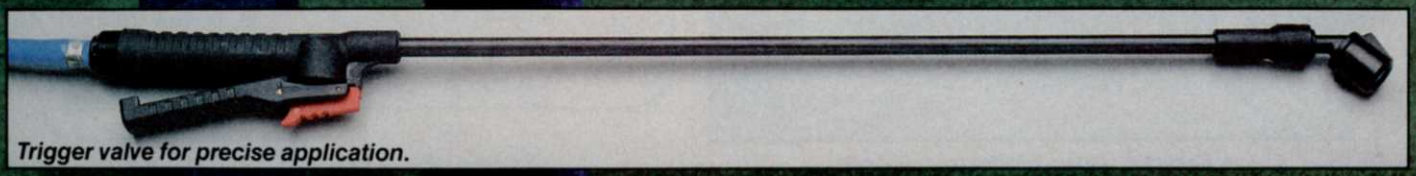
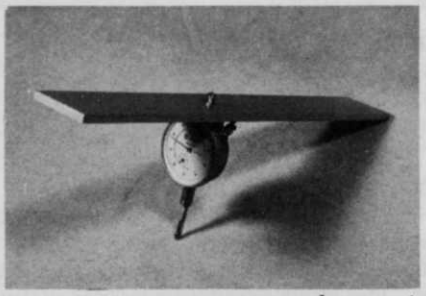
Easy to pump. Easy-to-read volume gauge.

Three special nozzles.



Trigger valve for precise application.

Circle No. 127 on Reader Inquiry Card



ments on greensmowers or other precision mowers. By incorporating a dial indicator with a unique adjusting bar apparatus, highly accurate measurements can be made at the cutting edge of the bedknife (to .001 inch), virtually eliminating operator error in both setting of the adjustment bar and the mower.

Circle No. 179 on Reader Inquiry Card

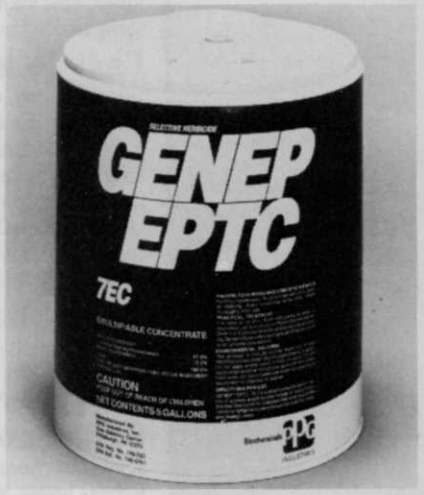
Solve landscape problems with Trevira

Trevira Spunbond engineering fabric is an effective tool in solving problems of landscape architects. Trevira has been successfully utilized in applications involving access road stabilization, erosion control, asphalt concrete overlays and drainage control. Hoechst Fibers suggests usage as pond liners, soil separators for turf blocks, walkways and vertical drainage in grassed areas.

Circle No. 180 on Reader Inquiry Card

Herbicide enhances crop yields

GENEP EPTC selective herbicide from PPG Industries, which controls weeds to enhance yields of vegetables, fruits and ornamentals, has received



EPA registration. According to Thomas C. Zinninger, biochemicals business manager of PPG Industries' Agricultural and Performance Chemical Division, the product can protect more than 20 crops from broadleaf weeds and grasses.

"GENEP EPTC herbicide has low application rates, making it economical to use, and it acts quickly, with no carry-over residues to bother rotation crops," Zinninger said. The herbicide allows a variety of application methods for various regions, and can be blended with fluid fertilizers to enhance yields or with other herbicides for broader control.

Circle No. 181 on Reader Inquiry Card

Ransome mower with three cutting widths

Ransomes crew of self-propelled rotary mowers offer three different cutting widths to meet specific job needs. The mid-size mower is available in 32 inch, 36 inch or 48 inch cutting deck widths.

All three models feature 11 hp Briggs & Stratton engines, variable speed drive pulley, 8 quart fuel tank and power hand grips which control

Continued on page 92

Clean Up Lakes, Ponds, River Fronts

Mud Cat's Aquatic Weed Harvester restores ecological balance through fast, efficient removal of both floating and submerged weeds. Independently controlled paddle wheels permit easy maneuvering, resist clogging in heaviest weed beds. Unit operates in inches of water to cut close to shore. Easily moved from job to job on trailers rated for highway speeds. Available in cutting swaths to 8 feet, operating depths to 5 feet, capacities to 660 cubic feet. Optional shore off-loading conveyor unit permits faster turnaround.

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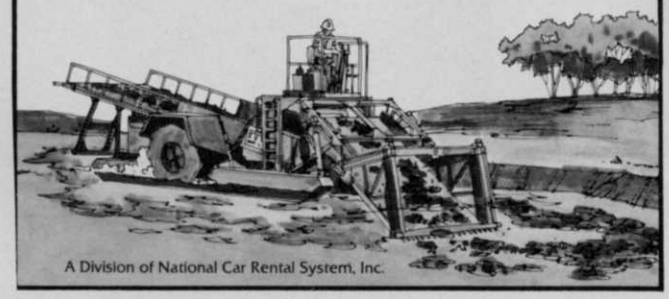

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M-C MATHEWS COMPANY

Lawn Genie pick-up mower

Saves work all year 'round

- Spring - Thatches, renovates and picks up in one pass
- Summer - Mows and loads clippings in quick-dump hopper
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Change mowing or thatching blades in seconds with M-C's patented hanger design.

Four cutting widths from 36" to 72", engine driven or P.T.O.

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Iron Horse Quality Equipment

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RAIN BIRD®

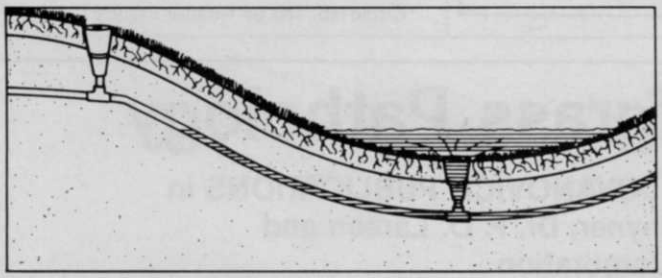
THE SPRINKLER FAMILY THAT MAKES LIFE EASIER.

MINI-PAW sprinklers offer low trajectory throw and superior performance with low gallonage operation.

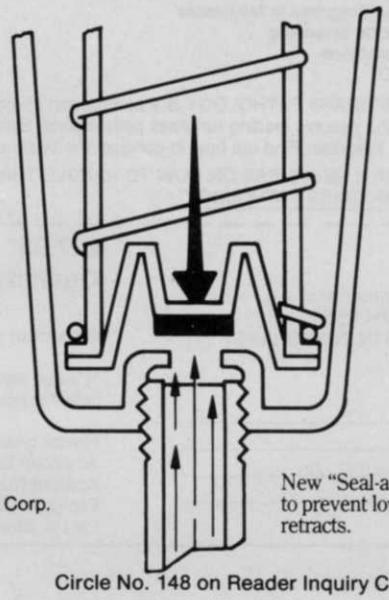
MINI-PAW sprinkler performance is boosted with new nozzles that provide "Short Range" and full or part circle performance out to 40 feet.

Just about every irrigation professional is familiar with the Rain Bird MINI-PAW® pop-up sprinkler. The word is out that the MINI-PAW 15103 outperforms its competition six-to-one, efficiently covering the same area as six conventional spray heads. That means installers have less pipe and fewer valves to worry about and simplier operation and quicker installation to look forward to.

Now Rain Bird technology makes life even easier with three new MINI-PAW models that incorporate the same precision engineering that went into the original—with a few added bonuses. Rain Bird had added low head drainage prevention, short range performance and full or part circle throw out to 40 feet. More than ever, the MINI-PAW family is simply better.



Low head drainage occurs when water seeps out lowest head on the line. New "Seal-a-Matic" option prevents this problem.



New "Seal-a-Matic" option closes inlet to prevent low head drainage when sprinkler retracts.

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Turf Division
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TURF MANAGERS' HANDBOOK

By Dr. William Daniel and Dr. Ray Freeborg

$23.95* **hardcover** $18.95* **paperback**

This essential reference book covers:

- scope and organization
- grasses and grooming
- rootzones and water
- nutrition
- pests and controls
- uses of turf
- serving turf needs
- AND MORE

The TURF MANAGERS' HANDBOOK is an easy on-the-job reference to planning, purchasing, hiring, construction, and plant selection. These 424 pages contain 150 illustrations, 96 color photographs plus 240 tables and forms.

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WTT 53

each wheel independently for mowing, stopping or power turning. Options and accessories include an 11 hp Honda engine, and wire or metal grass catchers.

Circle No. 182 on Reader Inquiry Card

Dobbins sprayers versatile, mobile

The new Dobbins CS-25 and CS-25S electric power sprayers bring new versatility and mobility to power spraying, according to Master Manufacturing of Sioux City, IA.

The sprayers draw power from the 12 volt battery of a garden tractor or pickup truck, explained Milt Glazer, president of Master Manufacturing, which makes the new models. The CS-25 is a trailer model for towing behind a garden tractor, while the CS-25S is on a skid for easy transfer to a pickup truck or other mounting.

Both models allow easy application of fertilizers, pesticides and herbicides without the added weight, noise and fuel costs of a gasoline engine. And the 25-gallon capacity tank makes it possible to cover a larger area with fewer stops to refill. Attachments are available.

Circle No. 183 on Reader Inquiry Card

Advances in Turfgrass Pathology

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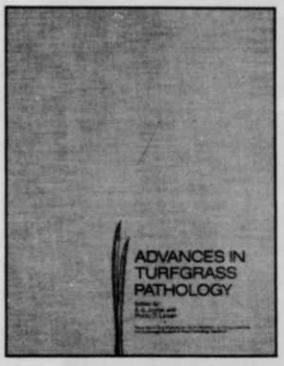

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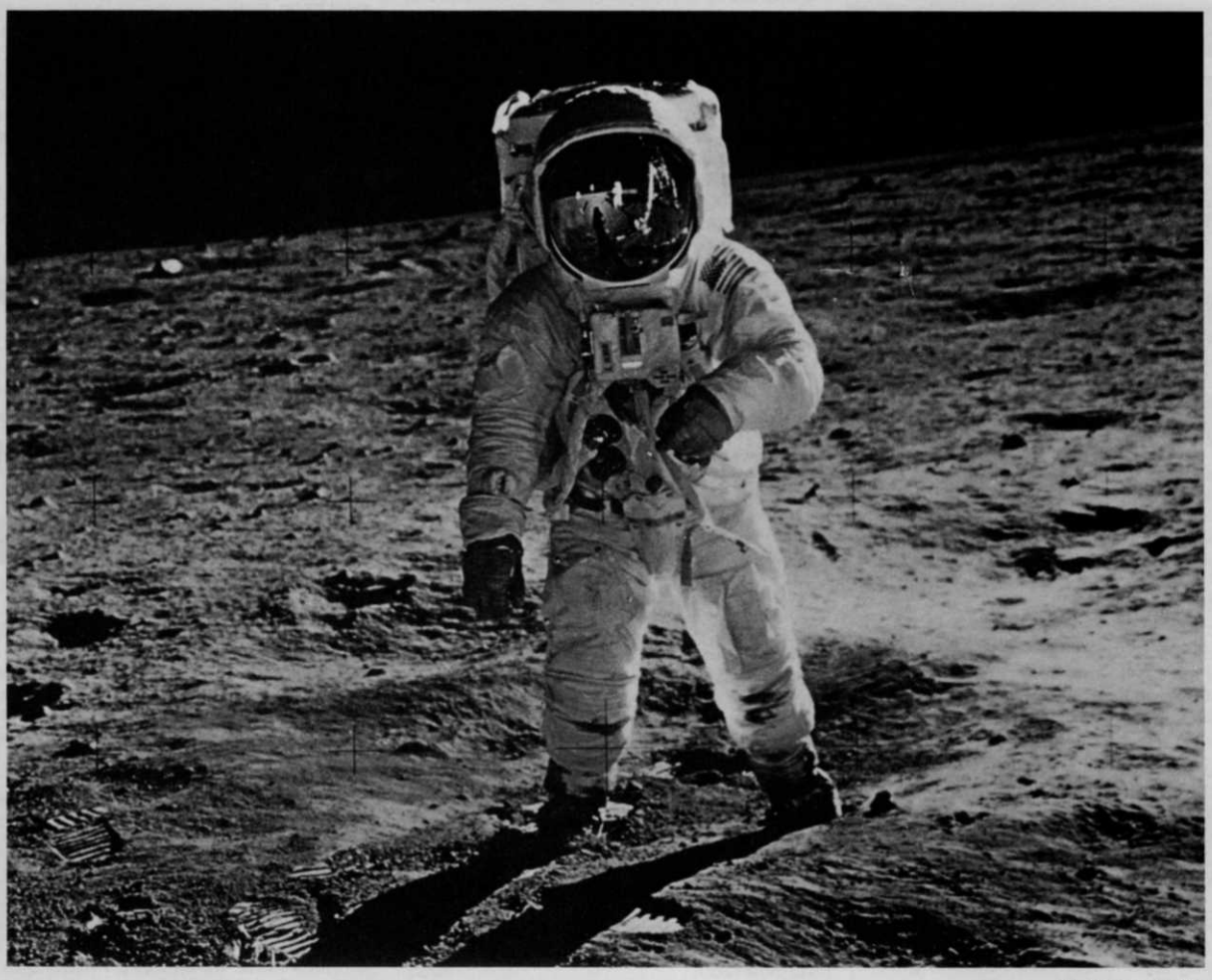

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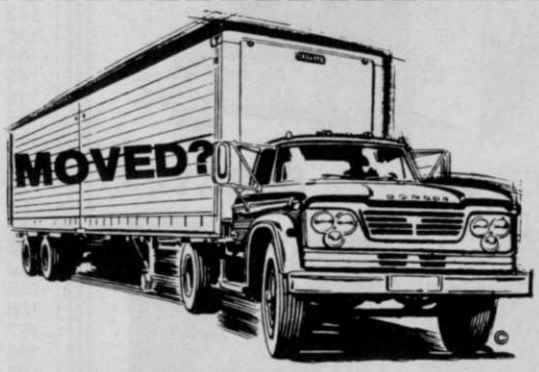

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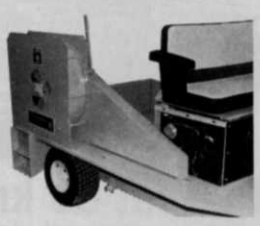

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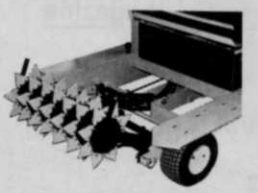

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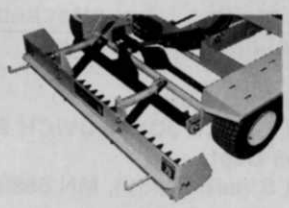

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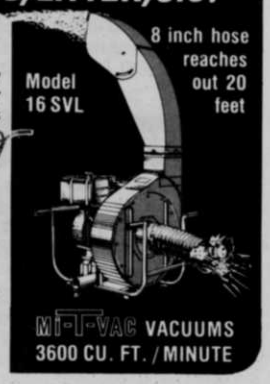

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